NOTE

This Microfiche meets the quality requirements of the American National Standard for Microfiche of Documents (ANSI PH5.9-1975). However, because of imperfections in the document from which it was made, it contains images that are illegible or difficult to read. The source document for this microfiche is the best copy that could be obtained prior to filming.

CIS

Congressional Information Service, Inc.
Washington, D.C.

98th Congress
2d Session

COMMITTEE PRINT

S. PRT.
98-239

EMERGING ISSUES IN THE DELIVERY OF RURAL HEALTH SERVICES

PREPARED FOR THE

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY UNITED STATES SENATE

NOVEMBER 1984

Printed for the use of the
Committee on Agriculture, Nutrition, and Forestry

U.S. GOVERNMENT PRINTING OFFICE
38-977 O
WASHINGTON : 1984

S162-5

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

JESSE HELMS, North Carolina, *Chairman*

BOB DOLE, Kansas
RICHARD G. LUGAR, Indiana
THAD COCHRAN, Mississippi
RUDY BOSCHWITZ, Minnesota
ROGER W. JEPSEN, Iowa
PAULA HAWKINS, Florida
MARK ANDREWS, North Dakota
PETE WILSON, California
ORRIN G. HATCH, Utah

WALTER D. HUDDLESTON, Kentucky
PATRICK J. LEAHY, Vermont
EDWARD ZORINSKY, Nebraska
JOHN MELCHER, Montana
DAVID H. PRYOR, Arkansas
DAVID L. BOREN, Oklahoma
ALAN J. DIXON, Illinois
HOWELL HEFLIN, Alabama

George S. Dunlop, *Chief of Staff*
J. Robert Franks, *General Counsel*
Carl P. Rose, *General Counsel and Staff Director for the Minority*
Warren B. Oxford, *Printer/Chief Clerk*

FOREWORD

During the past decade, Americans have witnessed a number of significant and noteworthy advances in the medical sciences. Despite these remarkable achievements, for many small towns and rural communities in our country, the development and delivery of effective, accessible and affordable health services remains an elusive and unmet goal. In large part, the foundation of future efforts to improve the health status of rural Americans will depend on the adequacy of the research which is being performed now.

In recent years, rural health research has offered many insights into the health care needs of rural Americans and has identified effective methods for addressing those needs in sparsely populated contexts; yet, there is still much to be learned. The research contained in this volume illustrates the journey that has begun, illuminates part of the road that lies ahead of us, and suggests some of the paths which deserve to be explored.

While not every member of the Committee on Agriculture, Nutrition, and Forestry necessarily agrees with the contents herein, this publication should be of interest to rural health care providers, researchers, and policymakers as they contemplate the future.

PATRICK L. LEAHY,
U.S. Senator.

CONTENTS

Page

Foreword III

Introduction 1

Section A: Assessing the Need and Demand for Rural Health Care:

- Chapter 1: New Residents and Rural Health Care by John Kushman, Patricia Cowper, and Ellen Radovic 5
- Chapter 2: Relatives, Friends, and Health Status Among Older Persons: An Analysis by Age, Sex, and Residence by Charles O. Crawford, Heather N. Hong, and Janet H. Armstrong 13
- Chapter 3: Premature Institutionalization Among the Rural Elderly by Vernon L. Greene 23
- Chapter 4: Rural-Urban Differences in the Determinants of Physician Utilization by Gary S. Levitz and James P. Curry 31

Section B: The Provision and Evaluation of Rural Health Services:

- Chapter 5: Evaluation of a Program for Comprehensive Health Improvement in Three Rural Counties by Lee A. Crandall and Starr Silver 47
- Chapter 6: Market Structure and Outcome for Volunteer Ambulance Services by Harry Perlstadt 58
- Chapter 7: Deterring the Onset of Smoking in Rural Vermont Schools: Results from a Two-Year Study by David Holmes, Robert Jones, Brian McPherson, John Clarke, and Alton Roberts 70

LIST OF TABLES AND FIGURES

Table 1.1 Third Party Doctor Bill Coverage by Resident Status (in percent)—Northern Area 10

Table 1.2 Third Party Doctor Bill Coverage by Resident Status (in percent)—Lake County 10

Table 1.3 Percent Who Lose Income From Work to See Doctor in Work Hours—Northern Area 11

Table 1.4 Percent Who Lose Income From Work to See Doctor in Work Hours—Lake County 11

Table 1.5 Type of Care by Newcomer Status—Northern Area 12

Table 1.6 Type of Care by Newcomer Status—Lake County 12

Table 2.1 Perceived Frequency of Visiting Relatives and Perceived Health Status 19

Table 2.2 Perceived Frequency of Visiting Friends and Neighbors and Perceived Health Status 19

Table 2.3 Relationship of Perceived Frequency of Visiting Relatives, and of Visiting Friends and Neighbors, to Perceived Health Status, by Age 20

Table 2.4 Relationship of Perceived Frequency of Visiting Relatives and of Visiting Friends and Neighbors, to Perceived Health Status, by Sex 21

Table 2.5 Relationship of Perceived Frequency of Visiting Relatives, and of Visiting Friends and Neighbors, to Perceived Health Status, by Residence 22

Table 3.1 Demographic Characteristics of Rural and Urban Nursing Home Patients 28

Table 3.2 Functional Impairment Levels in ADL for Rural and Urban Nursing Home Patients 28

Table 3.3 Impairment Levels in Psychosocial and Communication Functioning for Rural and Urban Nursing Home Patients 29

List of Tables and Figures—Continued

Page
Table 3.4 Analysis of Covariance for Impairment Levels by Rural-Urban Residence 30
Table 3.5 Standard Deviations of Impairment Scores for Rural and Urban Nursing Home Patients 30
Table 4.1 Operationalization of Variables 43
Table 4.2 Means and Variables in the Analysis by Percent 44
Table 4.3 Regression Analysis of Physician Visits 45
Figure 5.1 Screening Activities of the Florida Comprehensive Health Improvement Project (March 1980–June 1981) 55
Figure 5.2 Risk Reduction Activities of the Florida Comprehensive Health Improvement Project (March 1980–June 1981) 56
Figure 5.3 Estimates of Costs and Costs Per Person Served for Various Program Activities of the Florida Comprehensive Health Improvement Project 57
Table 6.1 Questionnaire Response Rate 66
Table 6.2 Breaking Even by Type of Organization and Degree of Affiliation 66
Table 6.3 Breaking Even by Demand 63
Table 6.4 Breaking Even by Size of Organization 67
Table 6.5 Breaking Even by Type of Organization and Competition 67
Table 6.6 Breaking Even by Degree of Affiliation and Competition 67
Table 6.7 Breaking Even by Degree of Affiliation and Competition Among Services Affiliated with Fire Departments or Local Government 68
Table 6.8 Breaking Even by Demand and Competition 68
Table 6.9 Breaking Even by Organizational Size and Competition 69
Table 7.1 Continuum of Smoking Interventions 75
Table 7.2 Characteristics—Percent Smoked Last Week (Standard Error in Parentheses) 76
Table 7.3 Characteristics—Smoked Last Week (Standard Error in Parentheses) 77
Table 7.4 Degree of Rurality as an Influence on Smoking Behavior Over Time 78
Figure 7.5 Percent of Females Who Smoked Last Week 79
Figure 7.6 Comparison of Smoking Prevalence Rate Among Experimental Groups 80

INTRODUCTION

Rural health is rapidly becoming a legitimate and recognized field of inquiry among scholars. A recent survey of research focused on rural health identified 232 completed or ongoing projects (Cordes, 1983); and a concurrent search of the professional literature from 1975 to 1981 uncovered 270 published articles and unpublished papers presented at professional meetings and conferences that dealt with rural health issues (Cordes, Eisele, Gonzales, and Lloyd, 1983). In addition, during the past year two excellent books on rural health care were published (Hassinger, 1982; Rosenblatt and Moscovice, 1982) exploring the uniquenesses and special circumstances surrounding the delivery of health services in small towns and rural communities of the contemporary United States.

This escalation in the volume of research on rural health could not have occurred at a more fortuitous time because both rural American and American health policy are in major states of transition. One of the principal instruments of change in contemporary rural America has been the unanticipated increase in population growth, and the concomitant social upheaval caused by that migration, which has been occurring since the mid-1960's (Beale, 1975). Between 1970 and 1980 the nonmetropolitan population in all regions of the United States, except the South, grew at a faster rate than did the metropolitan population, reversing a decades-long trend of flight from the country to the city (Beale).

In a similar vein, American health policy—while always in a state of change, at best and crisis, at worst—is at a crossroads that has had particular relevance for rural communities. The traditional concerns about physician distribution, for example, have been overshadowed by apprehension about a surplus of doctors rather that a shortage (Department of Health and Human Services, 1980). In another arena, economic and political forces have resulted in several Federal health initiatives that included strong rural components, such as the National Health Service Corps and Community Health Center Program, being in danger of either elimination or significant reductions in scope. In addition recent medicare reforms—(such as prospective reimbursement) as well as the austerity measures imposed in the Medicaid Program, have special relevance for rural areas because of their higher proportion of elderly and poor when compared to urban communities (Jurich, Smith, and Polson, 1983).

Despite the considerable growth of research on rural health that has occurred during the past decade and our greater understanding of the symbiotic relationship between health and environment (both social and physical)—much more knowledge is desperately needed. By way of illustration, the two recently published books on rural health reach vastly different conclusions on even the most basis of issues. Rosenblatt and Moscovice (1982), for example, argue that rural people, relative to their city cousins, have greater health care needs. They support their argument by citing infant and maternal mortality rates as well as the incidence of chronic conditions. Hassinger (1982), in contrast, is not at all convinced that rural residents have greater health needs and uses data on acute conditions, days of restricted activity, and days of bed disability to support his view.

Similarily, Rosenblatt and Moscovice (1982) disagree with Hassinger (1982) as to why the use of health services is less for rural than for urban people. Rosenblatt and Moscovice attribute differences in service utilization patterns to discrepancies in the availability and accessibility of health services. Whereas Hassinger argues that primary groups and social support networks—that is, families, friends, and neighbors—are more influential in rural than in urban environments; and, that these groups and networks: (1) provide alternatives to the use of professional services, such as home health care; and (2) serve as validators of illness, denying the sick role to some individuals.

When disagreements exist on such fundamental issues as whether health care needs are greater in rural as compared to urban areas, or why rural residents use fewer health services than do their urban counterparts, the urgency and demand for more, and better, research becomes blatantly obvious. Promoting high quality rural health research is one of the functions of the American Rural Health Association, and the annual meetings of the Association have become an important forum for disseminating the latest in research findings. The articles contained in this volume were presented originally at the 1982 meeting of the Association held in Jeffersonville, VT. Because of their potential for enhancing our understanding of rural health care issues, and their unwavering high standards, they have been assembled in one place for others to review.

The articles have been organized into two broad categories: (1) "Assessing the Need and Demand for Rural Health Care"; and (2) "The Provision and Evaluation of Rural Health Services". With two important exceptions, this two-part conceptual framework is akin to the supply and demand analysis used in economics. One exception is that economists are not usually concerned with need, per se. Instead, their focus is on that portion of need which gets translated into effective demand, that is, the ability and willingness of consumers to purchase goods and services. However, affluent and civilized societies have adopted policies that promote access to some minimal level of essential services, including health care, for all citizens regardless of their ability to pay.

Second, the supply and demand for health services, unlike most other goods and services, are not independent of each other. Although the initial decision to seek or demand health care is typically left to the discretion of individuals, once the health care delivery system is entered the individual loses considerable control over selecting the services to be received. Instead, the supplier (that is, the health care provider) begins to make many decisions on behalf of the consumer. For example, the provider is the major force in such decisions as: (1) when and how often the patient should return for re-examination; (2) whether the patient should be admitted to a hospital and which hospital should be chosen (depending, in large part, on the hospital at which the provider has privileges); and (3) when the hospital and which hospital should be chosen (depending, in large part, if the hospitalized patient should be discharged. By way of further illustration, one recent study indicated that approximately 40 percent of visits to physicians were initiated by the physician (Wilensky and Rossiter, 1980).

The need/demand dimension of this framework is the focus of the first section of this document. Four diverse and provocative articles are included. Kushman and Cowper, and Radovic examine the stresses and additional demands created by an influx of new residents into rural areas. Given the recent urban to rural migration, the issue addressed by these authors is extremely timely. The next two papers in the opening section have the rural elderly as a common focal point. Such a focal point is particularly relevant to rural health planners given the higher percentage of the elderly who reside in smaller towns and rural communities (Clifford, et al, in press). The article by Crawford and his colleagues examines the effect of social relationships on health status. Health status is, of course, an important indicator of the need for services and simultaneously influences the demand for services. The third article in the opening section, by Greene, examines the demand for a specific service, namely skilled nursing home care for the elderly. His provocative hypothesis, supported by data from Arizona, is that the paucity of certain services in rural areas—for example, home health care—may lead to a greater incidence of premature institutionalization among the rural as compared with the urban elderly. Although it is common to refer to a rural-urban dichotomy, the article by Levitz and Curry argues that such an approach ignores the diversity which exists within contemporary rural America. In their work they examine the determinants of physician utilization within each of four categories of rurality.

The second section in this document focuses on the supply or provision of services. The first of the three articles included in this section, by Perlstadt, examines one of the most crucial services of all—emergency medical care. Perlstadt analyzes the effects of organizational linkages, demand, scale of operation, and competition on the financial solvency of rural volunteer ambulance services. At the opposite end of the spectrum from emergency care is preventive care, and is the focus of the next article by Crandall and Silver. They describe and evaluate a project operated in three rural counties that directed special emphasis to the needs of individuals at risk from cardiovascular disease, accidental death or disablement, teenage pregnancy and venereal disease. The final article in this section, by Holmes and his colleagues, describes a health education program designed to deter cigarette smoking among youth. A particular concern of this effort was the generalizability and effectiveness for rural communities of programs originally developed for urban implementation.

Although the seven articles in this document provide specific insights into specific issues, a more subtle message is also contained in the collection. That subliminal communication is that rural

America is diverse and dynamic—consequently so are the issues related to rural health care. Both researchers and policymakers must recognize, appreciate, and understand the diversity in contemporary rural lifestyles and illuminate the consequences of those dynamics for the structure and content of health care systems. We have intended this document to provide insights into rural health issues, while simultaneously increasing the sensitivity of researchers and policymakers to the complexity and importance of the mosaic which comprises the development, delivery, and evaluation of rural health care.

REFERENCES

Beale, C. L. *The Revival of Population Growth in Nonmetropolitan America.* Washington, D.C.: U.S. Department of Agriculture, Economic Development Division, Economic Research Service, ERS-605, 1975.

Beale, C. L. *Rural and Small Town Population Change, 1970-1980.* Washington, D.C.: U.S. Department of Agriculture, Economics and Statistics Service, ESS-5, February 1981.

Clifford, W. B., Heaton, T. B., Voss, P. R. and Fuguitt, G. V. "The rural elderly in demographic perspective." In R. T. Coward and G. R. Lee (Eds.), *The Elderly in Rural Society: Every Fourth Elder.* New York: Springer Publishing Company, Inc., in press.

Cordes, S. M. *Rural Health Care Delivery: A Compilation of Recent and Ongoing Research.* University Park, Pennsylvania: The Pennsylvania State University, Department of Agricultural Economics and Rural Sociology, No. 163, March 1983.

Cordes, S. M., Eisele, T. W., Gonzalez, M. L. and Lloyd, R. C. *An Annotated Bibliography of Rural Health Research, 1975-1981.* University Park, Pennsylvania: The Pennsylvania State University, Department of Agricultural Economics and Rural Sociology, No. 168, May 1983.

Department of Health and Human Services, *Summary Report of the Graduate Medical Examination National Advisory Committee to the Secretary, DHHS.* Washington, D.C.: Public Health Service, Health Resources Administration, DHHS Publication No. (HRA) 81-651, September 1980.

Hassinger, E. W. *Rural Health Organization: Social Networks and Regionalization.* Ames, Iowa: Iowa State University Press, 1982.

Jurich, A. P., Smith, W. M., Jr., and Polson, C. J. "Families and social problems: Uncovering reality in rural America." In R. T. Coward and W. M. Smith, Jr. (Eds), *Family Services: Issues and Opportunities in Contemporary Rural America.* Lincoln, Nebraska: The University of Nebraska Press, 1983, 41-66.

Rosenblatt, R. A. and Moscovice, I. S. *Rural Health Care.* New York: John Wiley and Sons, 1982.

Wilensky, G. and Rossiter, L. The Magnitude and Determinants of Physician Initiated Visits in the United States. Paper presented at the World Congress on Health Economics, Leiden University, The Netherlands, September 1980.

SECTION A—ASSESSING THE NEED AND DEMAND FOR RURAL HEALTH CARE

NEW RESIDENTS AND RURAL HEALTH CARE

In most of the nation the historical population movement from rural to urban areas has been reversed in recent years. Rural areas are experiencing population increases associated with industries seeking to provide employees with an attractive environment, retirees escaping the high costs of urban living, the formation of counter culture enclaves, and the boomtowns of energy developments. This paper uses the concrete example of two rural areas of northern California to focus attention on the new rural residents and their implications for health planning and health care providers.

New residents can change the number of people in rural areas, the demographics and the associated age-and-sex specific service needs, the financial resources available to support health care, and the nature of the barriers to utilization. Of course, new residents are responsible for only part of the changes in population taking place; outmigrants, births, and deaths also affect population levels. In many areas, however, new residents are the dominant force.

THE STUDY

The data presented here were obtained in a mail survey conducted in early 1981 as part of the University of California's participation in a regional research project. The primary objective of the California project was to test mathematical models that may serve to describe and to predict geographic care-seeking patterns in rural areas. In order to construct a test case for the models, areas were selected that were thought to meet the following criteria: (1) no nearby large urban center dominating the local health care system; (2) well-defined sources of care in the area; (3) considerable variation in distances and travel times between consumer sites and care sources; (4) established practices in the area by new health professionals (for example, nurse practitioners); and (5) differences in the size and sophistication of hospitals from one source to another. The primary study area comprised contiguous parts of Siskiyou, Shasta, and Trinity Counties, near the Oregon border. A secondary study area is Lake County, lying northeast of the San Francisco Bay and centering on Clear Lake.

In order to carry out the project,[1] concentrations of household observations in or near the small towns throughout the study areas were needed. This could be accomplished only by sampling people living near very small towns more intensively than people living in towns with relatively large numbers of households. Crudely, the samples can be thought of as having an equal number of observations in each community. Redding, the largest city in the northern area, was omitted from the survey because it was expected to capture the vast majority of its citizen's primary care visits. Redding was included as a competitor for visits from the outlying areas.[2]

The sampling structure oversampled small communities and, hence, tended to oversample older people and people who are relatively geographically isolated. This sampling bias has not been corrected in the data presented here, so that some findings must be interpreted narrowly and some comparisons cannot be made. Nonetheless the data probably reflect the general situation of the population in the small towns and countryside.[3]

For purposes of this preliminary analysis a new resident or newcomer has been defined as a respondent who had lived in the county less than 10 years. Any definition is arbitrary. This one may tend to obscure the characteristics of the most recent arrivals. On the other hand, many residents regard anyone not born in the area as a new resident or even an interloper.

NEWCOMERS AND LONG-TERM RESIDENTS

Between 1970 and 1980 the population of the three counties that include the northern study area grew 41 percent. Although substantial, this growth was less than the 87 percent population growth in Lake County. Newcomers make up 46 percent of the sample in the northern area and 55 percent in Lake County.

It would seem unlikely that the effects of the newcomers would be more than the effects of numbers alone. In neither area is there a significant (statistically or otherwise) difference between the household income distributions of newcomers or long-time residents. Looking at the survey respondents and their spouses, there also are no apparent differences in the proportions not employed, employed full time, and employed part time.

In both study areas there is no doubt that the newcomers are largely part of the urban-to-rural migration. Almost one-fourth of the newcomers to the northern area came from five months in the densely populated east San Francisco Bay with another fourth from three Los Angeles area counties. The same urban areas contributed 59 percent of the newcomers to Lake County. It would be reasonable to expect that these newcomers might bring urban expectations and tastes for health care. They might also bring good third-party coverage from corporate group plans and the health care needs that accompany retirement age. On the other hand, counterculture migrations could bring antisystem attitudes.

---

[1] The project, Community Alternatives for Primary Health Care in the Rural West, was funded by the Western Rural Development Center. The California component has received additional support from the University of California at Davis Kellogg Public Service Research and Dissemination Program as a collaborative effort with the Northern California Health Systems Agency.

[2] For a more comprehensive report on the survey, see Kushman, Cowper and Carlson (1982).

[3] Only meager comparison data are available from the 1980 census at this writing. For the northern area (Siskiyou, Shasta and Trinity counties) the proportion of persons 65 years and older in the sample is 25 percent. This suggests a bias toward oversampling the elderly when it is compared to 16 percent 65 years and older for the three counties. For Lake County the sample proportion is 34 percent versus 28 percent in the 1980 census.

In fact, there do appear to be impacts on the area age distributions. In the northern area, newcomers have a larger proportion 45 years and older (especially 65 plus) than the long-timers. This area has seen an influx of retirees and young eccentrics. In Lake County the only apparent difference between newcomers and long-term residents is consistent with the perception of local planners that the new residents are working adults and early retirees.

Anyone dealing with health care is aware of the important role third-party coverage plays in aggregate expenditures and the great differences that can exist in access to care under different third-party schemes. Three basic types of third-party coverage are available to California consumers: Medi-care, Medi-Cal (California's version of medicaid), and private insurance. Private insurance can be comprehensive and provide sound protection and access for the purchaser and a good financial base for caregivers. Over time however, for private insurance schemes to continue providing effective coverage, premiums must keep up with medical inflation.

While medicare and Medi-Cal do not have premiums that must keep up with prices, they can present other problems related to inflation. Medicare and especially Medi-Cal reimbursement rates have lagged far behind inflation. As a result physicians are sometimes reluctant to accept patients with either plan. With respect to medicare, they are willing to accept assignment. With Medi-Cal, no charge can be made to the patient at all. Medicare also has the problem of incomplete coverage called medigap. Both programs, but especially Medi-Cal, can pose problems of access for patients and financial support for providers.

Tables 1.1 and 1.2 show the combinations of coverage for physicians' services possessed by respondents and their spouses in the two study areas. Medicare is augmented with a private insurance by 65 or 70 percent of the respondents, depending on the area. In the northern study area the differences between newcomers and long-term residents are not very great. If anything, a larger proportion of newcomers fall into the relatively unfavorable categories of Medi-Cal only or no coverage (27 percent versus 22 percent for long-timers). In Lake County a substantially larger proportion of the newcomers (about half) have private insurance than do long-term residents. Fewer of the newcomers to Lake County are without coverage than are the long-term residents.

From the standpoint of the newcomers and health care providers the more adequate coverage of the new residents in Lake County is preferable to the neutral or relatively poor position of the northern newcomers. The recent arrivals with private insurance coverage will find providers receptive and will contribute to the financial base for resources. People settling in the northern area with only Medi-Cal or without any coverage may have trouble finding care locally.

Newcomers with good coverage may not be a blessing for all Lake County residents in the short-term. Sad as it is to consider, groups of consumers compete for physician services. At least two studies have documented that Medi-Cal recipients are received by fewer providers when there is a larger private patient market and similar patterns have been found for other State medicaid programs and for medicare (Kushman, 1977-78; Parringer, 1980; Sloan, Mitchell and Cromwell, 1968). In the short-run newcomers with private coverage probably will reduce the availability of care to those least well covered and exacerbate an equity problem. Despite the very large number of studies that have analyzed physician location and migration, it is not possible to say whether enough physicians will follow the newcomers to Lake County in the long-run to overbalance the competitive effect on access for the poorly covered population.

In the northern area the balance of newcomers with poor coverage is unambiguously adverse. In the long-run such a trend could contribute to an erosion in the number of providers.

A financial barrier to care that is seldom documented, or even considered, is the income many people lose if they take time off from work to see a doctor. This issue is most relevant to people younger than 65 years, the vast majority of whom have not retired. Among the full-time workers 64 years or younger in our study areas, 40 percent of those in the northern area and 76 percent in Lake County lost income to see the doctor during work hours. When physicians have limited hours of operation, the loss of income could pose a real barrier to care.

Table 1.3 shows that among the total newcomer and long-term populations in the northern study area there is no apparent difference in the percent who would lose income. There may be a slightly greater incidence of loss among long-term residents when only those employed are considered.

In Lake County a greater incidence of loss among the long-term residents is obvious. As evidenced in table 1.4, the percentage losing income is roughly twice as great in the long-term residents group.

Given that newcomers to a rural area, because of differences in needs, expectations and barriers to care, may produce new demands on the local care system, it is natural to ask where those demands will be felt most. The questionnaire used in this study asked respondents what kind of provider they used first when they needed care. The available choices and the answers by length of residence are shown for the two study areas in tables 1.5 and 1.6.

Private physician's offices dominate all of the groups, but there is a clear tendency in both study areas for newcomers to indicate a greater use of large, visible sources of care (for example, emergency rooms, hospital clinics, and public clinics). In Lake County the proportion of newcomers using private physicians' offices is less than that for long-term residents by about 16 percentage points.

CONCLUDING COMMENTS

Newcomers may be a welcome addition to a rural community in many ways. In particular, they bring new business. For those with responsibilities for planning and delivering health care, however, they are likely to be a mixed blessing. Health care is distinguished by the pervasive influences of third-party money payments, high time costs of access, and the public mandate to provide an equitable distribution of services. Because of the coverage they possess, the time prices they face for care, and their sheer numbers, newcomers in the short-run are almost bound to put additional stress on the quantity of care that can be delivered, and on the equity of service distribution. In the long run, newcomers who enhance the resource base of the community may attract resources to ameliorate these problems, although the available evidence is insufficient to be sure a new improvement for all parties will result. Planners and providers must be sensitive to the stresses that accompany the new residents and anticipate them whenever possible.

Assuming that the major findings of the northern area survey would be unchanged if consumers in Redding were included, the data presented here illustrate well the difficult job of health system agencies the deal with huge rural territories. The impacts of the new residents on health care probably will be quite different in the two study areas. Useful and credible planning requires appropriate, perhaps quite different, anticipations and responses. It is not unreasonable to ask whether large-scale regional planning can address these needs and, moreover, whether efforts at the present and the proposed levels of funding can do the job.

At least two directions for future research are suggested by these considerations. First, research that likes up previous work on physician willingness to accept medicaid and medicare reimbursement with work on the migration of physicians might give some indication whether newcomers who initially compete care away from poorly covered long-term residents eventually attract enough providers to redress the damage. Second, research on ways for planners and providers to keep abreast of population changes and prepare for their effects in an era of declining resources would be useful.

REFERENCES

Rushman, J.E., Cowper, P. A., Carlson, H. *Report on Northern California Rural Primary Care.* Davis, California: University of California, Davis Kellogg Public Service Research and Dissemination Program and Northern California Health Systems Agency, 1982.

Kushman, J.E. Physician participation in Medicaid, *Western Journal of Agriculture Economics* 2(1), 21–33, 1977.

Kushman, J.E. Participation of Private Practice Dentists in Medicaid, *Inquiry,* 1978, 15(3), 225–233.

Parringer, L. The Medicare Assignment Rates of Physicians: Their Response to Changes in Reimbursement Policy. *Health Care Financing Review,* 1980, 1(3), 75–90.

Sloan, F., Mitchell, J., Cromwell, J. Physician Participation in State Medicaid Programs, *Inquiry,* 1978, (15(3), 225–233.

Table 1.1: Third Party Doctor Bill Coverage by Resident Status (in percent)--Northern Area

Coverage	Newcomer	Long-Term Resident
Medicare, MediCal, Private Insurance	2.1	2.0
Medicare, MediCal	3.3	3.5
Medicare, Private Insurance	10.5	13.0
Medicare	3.8	6.4
MediCal, Private Insurance	1.1	1.2
Private Insurance	52.2	52.2
MediCal	8.2	5.6
None	18.7	16.0
Total	100.0%	100.0%

n = 1115 (Respondents and Spouses)

Table 1.2: Third-Party Doctor Bill Coverage by Resident Status (in percent)--Lake County

Coverage	Newcomer	Long-Term Resident
Medicare, MediCal, Private Insurance	3.4	2.2
Medicare, MediCal	1.7	5.4
Medicare, Private Insurance	19.7	22.8
Medicare	7.7	8.7
MediCal, Private Insurance	1.7	2.2
Private Insurance	50.4	38.0
MediCal	4.3	4.3
None	11.1	16.3
Total	100.0%	100.0%

n = 209 (Respondents and Spouses)

Table 1.3: Percent Who Lose Income From Work to See Doctor in Work Hours--Northern Area

	Percent of Total (Percent of Those Employed)		
	Not Employed	Employed	
		Do Not Lose Income	Lose Income
Newcomers	46.0	31.9	22.1 (40.9)
Long-Term Residents	49.7	27.7	22.6 (44.9)

Table 1.4: Percent Who Lose Income From Work to See Doctor in Work Hours--Lake County

	Percent of Total (Percent of Those Employed)		
	Not Employed	Employed	
		Do Not Lose Income	Lose Income
Newcomers	57.6	30.5	11.9 (28.0)
Long-Term Residents	58.8	18.6	22.5 (54.8)

Table 1.5: Type of Care by Newcomer Status--Northern Area

	Newcomer	Long-Term Resident
Private Doctor's Office	80.6	85.1
Hospital Clinic	6.1	3.9
Hospital Emergency Room	2.8	2.9
Public Clinic	6.5	5.4
Other	2.8	1.5
No usual facility	1.1	1.3

n = 1323 (Respondents)

Table 1.6: Type of Care by Newcomer Status--Lake County

	Newcomer	Long-Term Resident
Private Doctor's Office	73.6	89.4
Hospital Clinic	5.8	2.9
Hospital Emergency Room	6.6	1.9
Public Clinic	5.8	0
Other	7.4	5.8
No usual facility	0.8	0

n = 225 (Respondents)

RELATIVES, FRIENDS, AND HEALTH STATUS AMONG OLDER PERSONS: AN ANALYSIS BY AGE, SEX, AND RESIDENCE

The relationship of social networks to health status has been studied and reported by a number of researchers (Gallo, 1981; Kaplan et al., 1977; Lin et al., 1979; McFarland et al., 1980; Pilisuk and Minkler, 1980; Turner, 1981; Unger and Powell, 1980; In general these findings report that the greater the number of networks or ties, the higher the health status. Social ties appear to be especially valuable in buffering the effects of stress, one source of ill health. Berkman and Syme (1979) have noted that social and community ties are especially important to those whose health status is impaired by rapid social and cultural changes as well as those living in situations characterized by social disorganization, and poverty.

The elderly as a group experience a number of unique life changes that can affect health status and social relationships—for example, retirement; loss of spouse and/or other close family members and friends; and consequences of the aging process per se. The aging process generally takes a greater toll among the old-old when compared to the younger-old. However, not all of these changes affect all elderly in the same way to make the elderly one age grouping, as they are so often viewed. They represent a wide spectrum of ages. Because age can affect health status and social relationships among the elderly, and because the elderly are not homogenous in regard to this characteristic, it seems important to examine the relationship between visiting patterns and health status within various age subgroupings of the elderly.

Two other variables important in considering social networks and health status among the elderly are sex and residence. Since older females have a lower death rate than older males, females are more likely to experience the loss of spouse. Arling (1976) found that widows have a high degree of resistance to isolation and that this may be conditioned by a number of factors. Because of these phenomena, it would appear that in an analysis of visiting patterns and health status, gender should be held constant to examine differences between males and females.

A third variable that seemed important in analyzing visiting patterns and health status among the elderly was type of community of residence. The elderly in more rural or open country areas may have a more difficult time maintaining social ties than those in more densely populated settlements because of: (1) inadequate transportation (Youmans, 1976) and (2) outmigration of younger persons (Schwarzweller et al., 1971). Bultena's research (1969) indicates that urban elderly may be more favored in ties with kin.

The purpose of this paper is to examine the hypothesis that perceived frequency of visiting with relatives and perceived frequency of visiting with friends and neighbors are related to perceived health status for a sample of older persons. These two forms of the main hypothesis (one for relatives and one for friends and neighbors) will then be considered with age, gender, and residence controlled. No hypotheses are made as to how the basic hypothesis will be altered when the control variables are introduced.

The authors believe that the large data base used here provided an opportunity not only to consider visiting patterns with relatives and friends/neighbors separately in relation to health status, but also to do this for several important subcategories of the elderly. It is hoped that the analyses presented here will advance the ongoing interest and research activity centered on social relationships and health status among the elderly.

The authors recognize that the relationship between social ties and health status can be viewed as going in either or both directions of causality: (1) social ties can contribute to health status, and (2) health status can contribute to the maintenance of social ties. However, the focus in this paper is on interpretations relevant to the contribution of social ties to health status.

METHODS

The data for this paper were taken from a telephone survey of 1,720 noninstitutionalized Nebraska residents aged 60 years of age and older conducted for the Nebraska Commission on Aging in 1978. The survey covered a number of different topics. From each of eight identified regions in Nebraska, a probability sample of 215 persons aged 60 and older was interviewed by telephone. Thus, a combination of quota, stratification, and probability sampling techniques were employed.

For this paper, perceived health status is measured by responses to the question: "Compared to others your age, would you say your health is: better than average, average, worse than average?" Several studies have indicated that perceived health status is a valid and reliable measure of objective health status (Fillenbaum 1979: Maddox and Douglas, 1973). The measures of perceived frequency of visiting were also perceptual in nature and were as follows: "How often do you visit with your relatives?" and "How often do you visit with your friends and neighbors?" Response categories for each question were: regularly, fairly often, hardly ever, never. Because of the small numbers in the hardly ever and never response categories, they were combined for analysis purposes.

FINDINGS

Since the uncontrolled and controlled analyses involve the use of different sample sizes and since statistical significance is a function of the size of the sample, it was decided to adopt a significance level of 0.01 for uncontrolled analysis and 0.05 for controlled analysis. Chi-square was selected to test for statistical significance. Cramer's V is used as a measure of association.

Findings for the relationship between visiting with relatives and perceived health status are given in table 2.1. The chi-square value of 16.10 with four degrees of freedom had a chance probability of 0.003, and therefore was judged to be statistically significant. Although it is statistically signficant, the small value of Cramer's V (0.069) indicates the relationship between visiting with relatives and perceived health status is not close. The distribution of responses in table 2.1 is in the predicted direction, although it is recognized that chi-square analysis does not permit a test of directionability. The percentage of respondents having better-than-average health in each of the visiting categories was: 42 percent in the regular category, 39 percent in the often category, and 30 percent in the hardly ever or never category. This gives a percentage difference between the extremes of 12 percent. The largest difference occurs between the hardly ever, never, and the other two categories (30 vs. 42 and 39 percent respectively). A point worthy of note about those respondents who hardly ever or never visited relatives is that they were nearly twice as likely to have worse than average health when compared to those who visited relatives regularly or often (17.4 vs. 9.4 and 9.3 percent, respectively).

The data on the relationship between visiting with friends and neighbors and perceived health status are given in table 2.2. The pattern of responses in table 2.2 is very similar to that just presented above. The chi-square value was 17.27, and with four degrees of freedom it had a chance probability of 0.002. Cramer's V for the relationship portrayed in table 2.1 was 0.069 while that for table 2.2 is 0.071, indicating similar strengths of relationship. The significance of those in the hardly ever, never category also stands out in table 2.2 as it did in table 2.1.

In comparing column totals in tables 2.1 and 2.2 it was found that respondents generally visited relatives more than they visited friends and neighbors. Slightly over 59 percent of the respondents said they visited relatives regularly while 53 percent said they visited friends and neighbors regularly. In the often category, the total for relatives was 31 percent; for friends and neighbors 32 percent. The number of respondents who visited relatives hardly ever or never was about two-thirds the number who visited friends and neighbors often (10 vs. 14 percent respectively).

The major findings from these bivariate analyses, then, are: (1) that for both visits with relatives and with friends and neighbors the chi-square values were statistically significant at the 0.01 level; (2) that the distributions of responses for the two types of visiting are very similar; and (3) that, overall, the perceived frequency of visiting with relatives was slightly greater than that for friends and neighbors. Some percentage differences were rather small, however.

Controlled analyses.—When age, gender and type of residence were introduced as separate controls, very few of the chi-square values were statistically significant (see tables 2.3 through 2.5). This failure to reach statistical significance results in part from the smaller total numbers created when the original sample was divided for control purposes. The measures of association for the controlled analyses are generally larger than those in tables 2.1 and 2.2.

The introduction of age as a control variable gave rise to some general but not strong differences between the two relationships for the three age groupings. For the younger old (60–69) the chi-square value for visits with relatives and perceived health status was statistically significant while that between visiting with friends and neighbors and perceived health status was not ($p = 0.022$ vs. $p = 0.336$). The values of Cramer's V were 0.088 for the former relationship and 0.056 for the latter.

For the middle old (70–79), a clear cut reversal of the relationships occurred. For the oldest age subgrouping (80 years and older) it was found that the chi-square values, the associated probabilities of these values, and values for Cramer's V were not much different.

These differential findings for the relationships of the two types of visiting and health status lend themselves to several interpretations. At younger ages (60–69) more visiting with relatives made possible by younger age and more mobility, may increase health status. Relatives may well play a more important role.

In comparison to the role of relatives, who may be as geographically close as neighbors, the role of neighbors and friends is apparently more important for the middle- and old-old (table 2.3). Indeed, the relationship between visiting with family and friends and perceived health status for the 70–79 year age grouping produced the second highest chi-square value (18.78) and the second highest Cramer's V (0.119) found among all of the analyses presented here. Among the old-old, none of the relationships between health status and visiting patterns were significant and the differences in the chi-square and V values found in each case were small. It should be noted for those 80 and over, however, that for both types of visiting, the percentages in the regularly visit and better than average health cells (52.5 and 54.6 percent) were higher than the percentages found in these cells for the two other age groupings (range for four = 36.7 to 42.9 percent). Regular visiting and better health appears to be much more related among the oldest of the old.

When gender was introduced as a control variable, some very notable variations in the main relationships emerged (table 2.4). The relationship between visiting with relatives and perceived health status was found to be much stronger for females than males. For males, the chi-square value was so small (2.15) that it had a very high probability of being due to chance (0.709). The value of V was .040. For females, on the other hand, the obtained chi-square value was quite large (23.90) and had a chance probability of less than 0.001. Furthermore, the value of V was 0.108. For the relationship between visiting with friends and neighbors and perceived health status, the chi-square values for the two sexes were statistically significant but not far apart ($x = 9.88$, $p = 0.042$ for males and $x = 12.51$, $p = 0.014$ for females). The sizes of Cramer's V were also similar (0.085 and 0.079).

The findings revealed, then, that although visiting with friends and neighbors has a strong relationship to perceived health status for both sexes, visiting with relatives was significantly related to perceived health only for females. It may well be that the apparent importance of relatives in the lives of females is due to special bonding that often occurs between mothers and daughters (Choler and Grunebaum, 1981). Data are not available here to determine whether the persons primarily visited by the females were daughters. Another possible explanation of the greater importance of visiting for females may be that elderly females, being widowed and/or alone more than elderly males, are viewed as needing more visits by relatives (either for help with chores or visiting only) and therefore are visited more than when they live with their spouses. Arling's research (1976) suggests another possible explanation—

that widows, as women, are much more competent than elderly males at developing and maintaining social relationships.

Of the 10 chi-square values obtained when residence was controlled (two relationships for five residence categories), only one was statistically significant (Table 2.5). This was between visits with friends and neighbors and perceived health status among open country respondents (x = 10,72, p = 0.030). The value of Cramer's V for this relationship (0.156) was the highest found for any relationship reported here. The important role of visiting friends and neighbors in the health status of open country elderly may well be due to the outmigration of younger family members. As children, and possibly other relatives, leave open country areas to live and seek employment in larger centers, the place of the family in visiting and, in turn, in health declines while the place of friends and neighbors increases to replace visiting by relatives. This finding is rather consistent with that of Bultena (1969) in which he found that visiting with kin by the elderly was greater in urban areas that in rural ones. In larger urban areas there is less need for children and other relatives to move to other areas to obtain employment.

SUMMARY AND CONCLUSIONS

This paper has examined the relationship of perceived frequency of visiting with relatives and perceived frequency of visiting with friends and neighbors to perceived health status among 1,720 noninstitutionalized elderly persons living in Nebraska in 1978. The basic hypothesis of an association between visiting and health status was supported in both instances.

When age, gender, and type of residence were introduced as separate control variables, the chi-square values were not statistically significant in most cases. However, although statistically significant chi-square values were not obtained, in most cases, the measure of association used in the analyses (Cramer's V) was higher in most controlled analyses than in the two uncontrolled analyses. This suggests that the smaller total numbers in each of the controlled analyses may have played a part in reduced significance levels.

In terms of their differences as related to perceived health status, the two kinds of visiting had differential impacts. Visiting with relatives was found to be more related to health status among females than males and among the young-old than middle-old or old-old.

The importance of visiting relatives among females was found to be most outstanding and deserving of further consideration in future research. Any such future research should devote special attention to: (1) the relationship to the elder female of those females visting them; (2) the marital status of the elderly females; (3) whether such visiting is related to assisting with tasks or chores connected with noninstitutionalized living; and (4) living arrangements. Any one or more of these factors may contribute to the important relationship.

From the analysis by residence, future work is suggested regarding the different types of visiting among open country elderly. Is the greater importance of friends and neighbors attributable to the absence of relatives?

The research reported here used perceived frequency of visiting. Such a measure has both strengths and weaknesses. One obvious weakness is that it does not consider or measure directly variations in actual frequency of visiting. However, the strength of perceived frequency lies in the measurement of how the older person himself/herself views frequency. Quality of relationships become important here. A high actual frequency of visiting in a low quality relationship could conceivably be perceived as too often whereas a high actual frequency of visiting in a high quality relationship could well be viewed as too little. Future research on this subject may well want to consider actual frequency, quality of the relationship, and perceived frequency.

REFERENCES

Arling, G. Resistance to Isolation Among Elderly Widows. *International Journal of Aging and Human Development*, 1976, 7, 67-86.

Berkman, L. F. and Syme, S. L. Social Networks, Host Resistance, and Mortality: A Nine Year Follow-Up Study of Alameda County Residents. *American Journal of Epidemiology*, 1979, 109, 186-204.

Bultena, G. L. Rural Urban Differences in the Familial Interaction of the Aged. *Rural Sociology*, 1969, 34, 5-15.

Cohler, B. J. and Grunebaum, H. U. *Mothers, Grandmothers and Daughters*. New York: John Wiley and Sons, 1981.

Fillenbaum, G. G. Social Context and Self-Assessments of Health Among the Elderly. *Journal of Health and Social Behavior*, 1979, 20, 45-51.

Gallo, F. The Energy of the Elderly Support Nework. Paper presented at Annual Meeting of American Public Health Association, Los Angeles, CA, November 1981.

Kaplan. B. H. et al. Social Support and Health. *Medical Care 15 Supplement*, 1977, 47-58.

Lin, N. et al. Social Support, Stressful Life Events, and Illness: A Model and an Empirical Test. *Journal of Health and Social Behavior*, 1979, 20, 108-119.

Maddox, G. L. and Douglass, E. B. Self-Assessment of Health: A Longitudinal Study. *Journal of Health and Social Behavior*, 1973, 14, 87-92.

McFarland, A. H. et al. A Longitudinal Study of the Influence of the Psychosocial Environment on Health Status: A Prelimiary Report. *Journal of Health and Social Behavior*, 1980, 36, 95-116.

Pilisuk, M. and Minkler, M. Supportive Networks: Life Ties for the Elderly. *Journal of Social Issues*, 1980, 36, 95-116.

Schwarzweller, H. K. et al. Mountain Families in Transition. University Park, Pennsylvania: The Pennsylvania State University Press, 1971.

Turner, R. J. Social Support as a Contingency in Psychological Well Being. *Journal of Health and Social Behavior*, 1981, 22, 357-367.

Unger, D. G. and Powell, D. G. Supporting Families Under Stress: The Role of the Social Networks. *Family Relations*, 1980, 29, 566-574.

Youmans, G. E. The Rural Aged. *The Annals of the American Academy*, 1977, 429, 81-90.

Table 2.1: Perceived Frequency of Visiting Relatives and Perceived Health Status

	Relative Visiting			
Health Status	Regularly	Often	Hardly Ever, Never	Total
	percent			
Better than average	42.1	38.8	30.1	39.9
Average	48.5	51.9	52.4	49.9
Worse than average	9.4	9.3	17.5	10.2
Total	100.0	100.0	100.0	100.0
Total N =	1,002	526	166	1,694
Row Percentages	59.1	31.1	9.8	100.0

X^2 = 16.10 Cramer's V = .069
d.f. = 4
p = .003

No information for 26 cases.

Table 2.2: Perceived Frequency of Visiting Friends and Neighbors and Perceived Health Status

	Friend/Neighbor Visiting			
Health Status	Regularly	Often	Hardly Ever, Never	Total
	percent			
Better than average	43.1	39.6	29.5	40.0
Average	48.0	50.5	56.0	49.9
Worse than average	9.0	9.8	14.5	10.0
Total N =	903	550	241	1,694
Row Percentages	53.3	32.5	14.2	100.0

X^2 = 17.27 Cramer's V = .071
d.f. = 4
p = .002

No information for 26 cases.

Table 2.3: Relationship of Perceived Frequency of Visiting Relatives, and of Visiting Friends and Neighbors, to Perceived Health Status, by Age.

		Frequency of Visiting					
		Relatives			Friends/Neighbors		
Age	Health Status	Regularly	Often	Hardly Ever, Never	Regularly	Often	Hardly Ever, Never
		percent					
60-69	Better than average	42.9	34.1	24.1	39.8	40.7	31.8
	Average	47.9	56.1	60.4	51.2	47.8	59.1
	Worse than average	9.2	9.8	15.5	9.0	11.5	9.1
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	457	223	58	402	226	110
		χ^2=11.47, p=.022, V=.088			χ^2=4.56, p=.336, V=.056		
70-79	Better than average	36.7	40.5	33.8	41.4	36.9	24.1
	Average	54.0	50.5	46.7	49.9	54.5	54.1
	Worse than average	9.3	9.0	9.5	8.7	8.6	21.8
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	376	210	77	343	233	87
		χ^2=8.53, p=.074, V=.080			χ^2=18.78, p=<.001, V=.119		
		percent					
80 and Over	Better than average	52.5	47.8	32.3	54.6	45.4	36.6
	Average	37.0	43.3	51.6	35.7	45.5	48.8
	Worse than average	10.5	8.9	16.1	9.7	9.1	14.6
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =						
		χ^2=4.95, p=.293, V=.093			χ^2=5.49, p=.241, V=.099		

Table 2.4: Relationship of Perceived Frequency of Visiting Relatives, and of Visiting Friends and Neighbors, to Perceived Health Status, by Sex.

Sex	Health Status	Frequency of Visiting					
		Relatives			Friends/Neighbors		
		Regularly	Often	Hardly Ever, Never	Regularly	Often	Hardly Ever, Never
		percent					
Male	Better than average	41.1	42.6	39.5	46.8	36.7	31.9
	Average	49.6	51.2	50.0	45.7	54.3	58.2
	Worse than average	9.3	6.2	10.5	7.5	9.0	9.9
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	399	209	76	372	221	91
		x^2=2.15, p=.709, V=.040			x^2=9.88, p=.042, V=.085		
Female	Better than average	42.8	36.4	22.2	40.5	41.8	28.0
	Average	47.7	52.2	54.5	49.5	47.8	54.7
	Worse than average	9.5	11.4	23.3	10.0	10.4	17.3
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	603	316	90	531	328	150
		x^2=23.90, p=<.001, V=.109			x^2=12.51, p=.014, V=.079		

Table 2.5: Relationship of Perceived Frequency of Visiting Relatives, and of Visiting Friends and Neighbors, to Perceived Health Status, by Residence.

		Frequency of Visiting					
		Relatives			Friends/Neighbors		
Residence	Health Status	Regularly	Often	Hardly Ever, Never	Regularly	Often	Hardly Ever, Never
		percent					
Open Country	Better than average	41.4	35.6	25.0	48.5	29.2	32.4
	Average	47.2	59.3	55.0	43.6	61.0	48.7
	Worse than average	11.4	5.1	20.0	7.9	9.8	18.9
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	140	59	20	101	82	37
		x^2=6.14, p=.189, V=.118			x^2=10.72, p=.030, V=.156		
Less than 2,500	Better than average	42.7	39.1	31.7	42.4	41.3	28.8
	Average	49.4	49.7	58.5	50.5	47.3	59.7
	Worse than average	7.9	11.2	9.8	7.1	11.4	11.5
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	279	169	41	269	167	62
		x^2=3.10, p=.542, V=.056			x^2=5.73, p=.220, V=.077		
		percent					
2,500-9,999	Better than average	43.3	34.4	33.3	44.9	37.6	25.0
	Average	51.4	59.3	51.3	48.6	56.9	66.7
	Worse than average	5.3	6.3	15.4	6.5	5.5	8.3
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	208	96	39	185	109	48
		x^2=7.60, p=.107, V=.105			x^2=6.97, p=.138, V=.101		
10,000-99,999	Better than average	39.9	41.9	34.1	40.7	42.0	33.9
	Average	49.5	50.0	46.4	49.3	47.9	51.8
	Worse than average	10.6	8.1	19.5	10.0	10.1	14.3
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	218	124	41	209	119	56
		x^2=4.34, p=.362, V=.075			x^2=1.57, p=.813, V=.045		
		percent					
10,000-or more	Better than average	43.3	41.0	20.0	41.7	46.6	27.1
	Average	42.7	44.9	52.0	43.2	41.1	52.1
	Worse than average	14.6	14.1	28.0	15.1	12.3	20.8
	Total =	100.0	100.0	100.0	100.0	100.0	100.0
	N =	157	78	25	139	73	48
		x^2=6.21, p=.184, V=.109			x^2=5.10, p=.277, V=.099		

PREMATURE INSTITUTIONALIZATION AMONG RURAL ELDERLY

Professionals and policy researchers have long recognized that rural areas face special problems of access and utilization for health care and social services (Kane, Dean and Solomon, 1979). Lower incomes, lower population densities and greater outreach and access distances all contribute to a relative shortage of formally organized social and health services for many rural residents. These problems are perhaps especially acute for the chronically impaired elderly living in rural areas.

For the impaired elderly, rural environments in some ways present particular risks and difficulties. For those with deficits in ambulation and sensimotor capacity, longer distances and the lack of convenient and safe methods of transportation can present serious barriers in access to esssential health and social services, to say nothing of access to necessities such as shopping and recreation. Also, the relative social and geographical isolation of the rural elderly makes them particularly at risk for acute, immobilizing illness or trauma (for example, strokes or falls) that may leave them helpless and undiscovered, particularly in view of their greater propensity to be found living alone. Further, access to such services is limited both by relative unavailability and the logistical problems caused by distance in providing them. This latter problem exists even when informal resource networks are in place, and has no doubt been exacerbated by the exodus of rural younger people to urban areas, often leaving aging parents behind (Bultena, 1969).

There is evidence that the rural elderly are particularly at risk for social isolation, poverty, illness and substandard housing (Coward, 1979; Hayslip, Ritter, Oltman, and McDonnel, 1980). It is also well documented that effective mobilization of resources to provide in-home care to the rural elderly lags far behind the development of such programs in urban areas. Hayslip et al. (1980) found rural social services systems for the impaired elderly to be strikingly underdeveloped as compared to those in urban areas, and agency perceptions of the needs of the rural elderly in their service areas often differed from the expressed needs of the elderly themselves in important aspects. Further, geographical resource allocation was found to bear little systematic relationship to the distribution of the elderly population. Perhaps by way of partially accounting for the observed deficiencies in resource availability and allocation, Taietz and Milton (1979) and Nelson (1980) have found that rural planning units are inferior to urban in structural and administrative characteristics related to their capacity for effective resource mobilization, particularly as regards the provision of services to the frail elderly in the community who are at risk for institutionalization. They found further that available resources for in-home care and the prevention of premature institutionalization of frail elderly were much more scarce in rural than in urban areas.

The argument has been made many times that the lack of access to resources in the community is a major factor predisposing the elderly generally to premature and unnecessary nursing home institutionalization. Indeed, this has been the basic rationale for a series of major policy initiatives designed to provide "alternatives to institutionalization" (Seidl, Applebaum, Austin, and Mahoney, 1981). The motivating idea is that by providing increased services to the impaired elderly in the community, persons who in the absence of such services would be forced into a nursing home will be permitted to remain in the community. Even for those not immediately at risk, such services may bolster health and social functioning so that the risk threshold is pushed back. Such programs thus serve both the humane purpose of permitting persons to maintain the dignity, autonomy and relatively normal social functioning of life in the community for as long and to as high an impairment level as possible, while at the same time minimizing the use of scarce and relatively expensive institutional resources. For a variety of reasons, no definitive study of the capacity of such programs to reduce nursing home utilization, or of their cost effectiveness relative to nursing home care, has yet been conducted (Weissert, 1981; Seidl, Applebaum, Austin, and Mahoney, 1981).

While there are a number of studies in the literature which document the relative paucity of essential services for the rural as compared to the urban elderly, there appear to have been no empirical studies of the possible consequences of this scarcity for nursing home utilization. If a relative lack of accessible community resources is in fact a predisposing factor in risk of premature nursing home entry by the frail elderly, then, other things equal, it would be expected that the rural elderly, who appear to face greater problems of availability and access to such resources, would be especially prone to premature institutionalization. Insofar as this is the case, it could then be expected that rural elderly would tend to enter nursing home care at younger ages and at lower levels of functional impairment than urban elderly. Whether such a pattern exists will be the main empirical question to be addressed here.

SAMPLING AND MEASUREMENT

The data base consists of observations on 292 patients in Skilled Nursing Facilities (SNF's) in Arizona, collected during April and May of 1980. The sample is a staged cluster sample. From a census of SNF's in the State, 28 were randomly selected at the first stage. Each selected institution then had chosen a random subsample of its patient population, with the patient subsample size proportional to the number of beds in the institution. For each sampled patient, a questionnaire was completed via interviews with facility staff (generally the charge nurse) knowledgeable with respect to the sampled patients. The reliability and validity of such staff interview data in long term care institutions is well supported in recent research (Kaufert, Green, Dunt, Corkhill, Cheese and Lockert, 1979). Where necessary, patient records were consulted. For purposes of the present study of utilization by elderly persons, patients under 55 years of age were eliminated, leaving a sample of 282.

The instrument (available on request to author) was designed to support a statewide planning effort by the Arizona Department of Health Services. For purposes of the present study it inquired into a variety of demographic and impairment characteristics of SNF patients. Demographic characteristics included current marital status, living arrangements at time of entry, sex, ethnicity (whether patient was Hispanic), whether patient was a county indigent, length of residence in county of institutionalization, length of current institutional residence and age at time of institutional entry. Impairment data included nine items measuring degree of impairment in activities of daily living (ADL): independent ambulation, bed-to-chair transfer, wheelchair use, bladder incontinence, bowel incontinence, bathing, dressing, toileting and eating.

Also included were nine items measuring the degree of psychosicial impairment: alertness (responsiveness to social and physical environment), impaired judgement, hallucination, depression, agitation, regression, wandering, verbal abusiveness, and propensity to be physically assaultive. Finally, the instrument included three items measuring degree of impairment in sight, hearing and speech. All items are slight adaptations of those found in the long-term care Miminum Data Set (U.S. Department of Health, Education and Welfare, 1979). For some parts of the data analysis to follow, the various impairment items were collapsed into unweighted linear composite scales. All items were coded so that higher scores indicated more severe impairment.

Arizona, from a geographical standpoint, is essentially a rural State: only 2 of 14 counties, Maricopa (Phoenix) and Pima (Tucson), contain population centers larger than 45,000. For purposes of the present study, patients in these counties are classified as urban, and the rest as rural. In this case, 70 of the 282 elderly SNF patients, or 25 percent, were classified as rural. This closely matches the population distribution of those over 55 in the State.

RESULTS

Table 3.1 presents rural-urban comparisons on selected demographic and residential characteristics of the SNF patients in the study. Observe first that urban and rural patients do not differ significantly in current marital status (about 20 percent are currently married), percent female (about 62 percent), percent with Hispanic surname (about 10 percent) or percentage who are county indigents (somewhat less than 40 percent). Arizona does not participate in medicaid, and indigent long term care is provided mainly through the counties.

On the average, rural patients are seen to have been residents of the county in which they are institutionalized for 41.8 years, while urban patients have been residents for an average of 21.5 years. Over 95 percent of rural patients and 90 percent of urban patients were institutionalized in their county of preinstitutional residence. Hence, there is a very strong tendency for rural patients to have been residents of the rural counties in which they are institutionalized. Consistent with previous research indicating that the rural elderly are disproportionately likely to be found living alone, significantly more rural than urban SNG patients were found to have been living alone at time of entry (21 as opposed to 13 percent). One sees that rural SNG patients have, on the average, been institutionalized nearly one-third longer than urban patients (2.9 as opposed to 2 years). Consistent with a premature entry hypothesis, mean age at entry for rural patients was 77.6 years, in contrast to a mean age at entry of 79.5 for urban patients. These differences are statistically significant.

In view of the well known higher incidence of many chronic and debilitating diseases and serious accidental traumas in rural areas, however, it could be that the observed difference in age at entry between rural and urban patients arises from rural patients being more impaired on the average at an earlier age, rather than to premature entry. An inspection of table 3.2 makes it clear, however, that rural patients are not only younger, but also considerably less impaired on the average in functional capacity on all indicators of ADL impairment except wheelchair utilization, and on the key psychosocial indicators of orientation and judgment. However, on indicators of antisocial behavior, active psychopathology and sensory communication impairment, urban and rural patients did not differ significantly.

To control for the possibility of spurious effects arising from prior differences in demographic characteristics, a series of one-way analyses of covariance were conducted. Age at entry and the impairment characteristics showing significant zero order rural-urban differences were used as dependent variables. The predictive factor was a rural-urban dummy and covariates were current marital status, whether the patient was living alone at time of entry ethnicity (whether the patient was Hispanic), patient sex and whether the patient was a county indigent. Marital status and prior living arrangements could obviously affect nursing home utilization. It was felt that Hispanic ethnicity, with its strong extended family ties, could affect the ability of an elderly person to remain in the community, as might patient sex, given the different morbidity and survivorship regimes experienced by men and women. Finally, incidence of indigency could reflect county policies, which might itself affect nursing home utilization.

A fixed effect ANCOVA model was estimated, with the main effects whose statistical significance is reported in table 3.4, being subject to prior adjustment for joint covariate effects. The standardized partial regression coefficient of each covariate residualized dependent variable regressed on the rural-urban factor is also reported. Given our coding, the coefficient is negative when adjusted rural scores on the dependent variables are less than urban scores. We observe that the pattern of relationships is identical to the zero case, though statistical significance is often reduced somewhat. Complete ANCOVA results for each dependent variable, too bulky to be reported here, are available to request to the author.

DISCUSSION

From the data, then, it appears that rural SNF patients in Arizona tend to enter institutional care at younger ages and at lower levels of functional impairment than do their urban counterparts, suggesting a propensity to premature institutionalization. A likely source of this propensity would seem to be the relative shortage of accessible health and social services found in rural areas of the State, which forces rural imparied elderly into institutional care sooner than their urban counterparts.

As in any nonexperimental cross-sectional study, however, causal inferences must be drawn cautiously. One competing hypothesis that might account for our findings, for example, is that the relative shortage of SNF beds in rural areas, which prevails also in Arizona, permits rural operators to cream applicants for those whose care will be easier to provide and perhaps more profitable (on the average, rural SNF occupancy rates were 98.2 percent, while urban rates were 92.6 percent, suggesting that demand for SNF beds may be tighter in rural areas). In general, these will be the relatively less impaired. However, were this the cause, it would be expected that the rural impairment score distributions would be truncated and thereby show less variability than the urban distributions. However, as an inspection of table 3.5 shows, the standard deviations of the three composite scales for rural patients exceed slightly those of urban patients and on this point the alternative hypothesis is not supported. Also, from a patient management standpoint, one would expect creaming to occur particularly on behavioral and psychoneurotic variables, but no such tendency is apparent (table 3.3).

While results must be interpreted cautiously in the absence of longitudinal data, it nevertheless appears that the rural elderly are entering nursing home care prematurely—at an earlier age and at lower levels of impairment—relative to the urban elderly. This tendency may be cause for concern on humanitarian and equity grounds, as well as from the standpoint of containment of costs arising from excessive and potentially unnecessary institutional utilization. It seems plausible that an important contributing factor in the situation is the well-documented scarcity of community based resources in rural areas. However, in the absence of specific measures of the resources available to individual patients prior to nursing home entry, this conclusion is by no means certain. Future research will wish to gather such information, preferably within a longitudinal design.

REFERENCES

Bultena, G. "Rural-urban differences in the familial interaction of the aged," *Rural Sociology,* 1969, 34, 5–15.

Coward, R. T. "Planning communicty services for the rural elderly: Implications from research," *The Gerontologist,* 1979, 19, 275–282.

Hayslip, B., Ritter, M. L., Ultman, R. M. and McDonnel, C., "Home care services and the rural elderly," *The Gerontologist,* 1980, 20, 192–199.

Kane, R., Dean, M. and Solomon, M. "An evaluation of rural health care research," *Evaluation Quarterly,* 1979, 3, No. 2, 139–189.

Kaufert, J. M., Green, S., Dunt, D. R., Corkhill, R., Cheese, A. L. and Locker, D., "Assessing functional status among elderly patients: A comparison of questionnaire and service provider ratings," *Med Care,* 1979, 17, 807–817.

Nelson, G. "Social services to the urban and rural aged: The experience of area agencies on aging," *The Gerontologist,* 1980, 35, 200–207.

Seidl, F. W., Applebaum, A., Austin, C. D. and Mahoney, K. J., "Delivering in-home services to the aged and disabled: The Wisconsin experiment." Madison, Wisconsin: Faye McBeath Institute on Aging and Adult Life, University of Wisconsin, Monographs on Aging, Number 3, 1981.

Taietz, P. and Milton, S., "Rural-urban differences in the structure of services for the elderly in upstate New York counties," *Journal of Gerontology,* 1979, 34, 429–437.

Weissert, W. "Toward a continuum of care for the elderly: A note of caution," *Public Policy,* 1981, 29, 66–77.

Table 3.1: Demographic Characteristics of Rural and Urban Nursing Home Patients

	Rural	Urban	Significance*
Percent Currently Married	.300	.203	n.s.
Percent Lived Alone	.214	.132	p<.040
Percent Female	.629	.623	n.s.
Percent Hispanic	.114	.099	n.s.
Percent County Indigent	.400	.382	n.s.
Mean Years in County	41.840	21.500	p<.001
Mean Years in Institution	2.950	2.040	p<.010
Mean Age at Entry	77.600	79.500	p<.070

*Two-tailed t-test of hypothesis of no difference. Differences not significant at the .10 level are reported as n.s.

Table 3.2: Functional Impairment Levels in ADL for Rural and Urban Nursing Home Patients

	Rural	Urban	Significance*
Ambulation	3.200	3.79	p<.030
Bed to Chair Transfer	2.640	3.08	p<.020
Wheelchair	3.010	3.33	n.s.
Bladder Incontinence	2.590	3.24	p <.010
Bowel Incontinence	1.970	2.31	p<.050
Bathing	3.080	3.58	p<.001
Dressing	2.890	2.76	p <.050
Toileting	2.450	2.76	p<.050
Feeding	1.500	1.78	p<.070
ADLSCORE (composite	23.400	28.20	p<.040

*Two-tailed t-test of hypothesis of no difference. Differences not significant at the .10 level are reported as n.s.

Table 3.3: Impairment Levels in Psychosocial and Communication Functioning for Rural and Urban Nursing Home Patients

	Rural	Urban	Significance*
Alertness	1.61	1.99	$p<.001$
Impaired Judgement	1.87	2.32	$p<.001$
Hallucination	1.27	1.34	n.s.
Depression	1.89	1.87	n.s.
Agitation	1.76	1.83	n.s.
Regression	1.59	1.56	n.s.
Wanders	1.29	1.30	n.s.
Verbally Abusive	1.29	1.42	n.s.
Assaultive	1.37	1.28	n.s.
Sight	1.99	1.77	n.s.
Hearing	1.90	1.69	n.s.
Speech	1.64	1.65	n.s.
PSYSCOPE (composite)	13.9	14.60	$p<.05$
SENSCOM (composite)	6.9	6.70	n.s.

*Two-tailed t-test of hypothesis of no difference. Differences not significant at the .10 level are reported as n.s.

Table 3.4: Analysis of Covariance for Impairment Levels by Rural-Urban Residence

	Covariate Adjusted Deviation Beta	Significance of Covariate Adjusted Main Effect Due to Rural-Urban Difference*
Ambulation	-.38	$p < .040$
Bed to Chair Transfer	-.27	$p < .050$
Bladder Incontinence	-.44	$p < .020$
Bowel Incontinence	-.31	$p < .060$
Bathing	-.36	$p < .001$
Dressing	-.22	$p < .030$
Toileting	-.21	$p < .090$
Feeding	-.11	n.s.
Alertness	-.32	$p < .001$
Impaired Judgement	-.34	$p < .001$
Age at Entry	-.21	$p < .080$

*F-ratio test of hypothesis of no difference. Differences not significant at the .10 level are reported as n.s.

Table 3.5: Standard Deviations of Impairment Scores for Rural and Urban Nursing Home Patients

	Rural	Urban
ADLSCORE	11.12	9.71
PSYSCORE	3.30	3.29
SENSCOM	2.21	2.16

RURAL-URBAN DIFFERENCES IN THE DETERMINANTS OF PHYSICIAN UTILIZATION

Numerous studies have shown that health services are less available and accessible in rural areas than in urban areas. Rural-urban differentials in the distribution of physicians and health facilities are well documented; residents of rural areas experience more home-bound sick days and have fewer physician visits than residents of urban areas. Rural areas find it difficult to compete with urban areas for health resources (Reilly, Legge, and Reilly, 1980). One important reason for this is the fact that although one-third of the Nation's population lives in rural areas, nearly one-half of the poor live in these areas (Congressional Budget Caucus, 1977). Thus, it is not surprising that individuals in rural areas experience difficulty in obtaining health care and that these areas do not attract health personnel and facilities in sufficient numbers to alleviate existing access problems (Wright, 1976).

To date, most research in this area has used a simple rural-urban dichotomy. While this approach has served to identify problems in rural areas, it ignores the diversity which exists within rural areas. As an example, in many studies rurality, itself, has been used as a proxy for other phenomena, such as physician availability, not taking into account the variation in availability among rural areas. The purpose of this paper is to study the determinants of physician utilization among adults in counties with different proportions of the population residing in urban areas. The accomplishment of this objective may provide a better understanding of physician utilization on a State-wide basis. In addition, our analysis includes direct measures of health resources availability at the county level. Specifically, in this analysis the physician/population ratio is employed as a measure of health resource availability and its effect on utilization among individuals drawn from a representative sample of the State of Minnesota is assessed.

BACKGROUND

As background to the present study, three areas, in order, will be addressed. First, the topic of approaches to the classification of rural areas will be reviewed. Second, health care problems in rural areas will be examined. Third, results of studies of medical care utilization in rural areas will be presented.

The measurement and meaning of rurality.—There are several approaches to the categorization of rural populations. The U.S. Census Bureau definition includes individuals in incorporated and unincorporated places of less than 2,500 inhabitants. Applying this definition to 1970 census data, the rural farm and nonfarm population totaled nearly 54 million people or 27 percent of the U.S. population. Blackmon (1979) defined rural areas as those counties located outside SMSA's having more than half their population living in communities of 2,500 or less. Waller (1974) described as rural those service areas of less than 30,000-40,000 persons or those with a population density of less than 50 persons per square mile. Although various definitions have been applied to the study of rural areas, several conclusions may be drawn about the effects of age, demographic and socioeconomic changes on the future of rural America.

The age structure of rural America differs from the urban population and has important implications for the analysis of health years of age or older, only 9.3 percent of the urban population is that age. Over 5 million senior citizens live in rural areas while in the rural areas of Iowa, Missouri, Nebraska, and Kansas, the proportion of the population age 65 and over tends to be high, often greater than 20 percent (Hassinger and Hobbs, 1973). It is estimated that by the year 2000 there will be approximately 30.6 million Americans 65 years of age and older and by 2030 there may be over 50 million. By 2000, the percent age of the "old-old" group (75 years of age and older) is expected to reach 44 percent (Kovar, 1977).

As a consequence, the prevalence of chronic disease and impairment is expected to increase. While people in their sixties and early seventies are relatively healthy, the majority of those over 75 need a wide range of supportive and restorative health and social services. Furthermore, the elderly are faced with a greater likelihood of medical expenses at a time when their economic resources are stable or in decline (Wiles, 1979).

Educational differences also exist between rural and urban areas. Of all persons over 25 years of age in the U.S. 31.1 percent completed high school. In rural nonfarm areas this figure was 29.4 percent and for rural farm areas 30.4 percent. The average number of years of school completed for the entire population was greater than the average for either the rural nonfarm or the rural farm population (12.1 years versus 11.2 and 10.8 years, respectively). In urban areas 12 percent of the population had 4 or more years of college while 7 percent of the rural nonfarm and 4.5 percent of the rural farm populations received this much education (U.S. Department of Agriculture, 1979).

Health care problems in rural America.—Numerous problems exits in rural areas which place both individuals and communities at a disadvantage in terms of the effective and efficient delivery of medical care. Among these problems are:

—*Location of facilities.*—Because there may be few or no local facilities, there is the need to travel some distance to obtain health care.

—*Lack of public transportation.*—For the most part, travel in rural areas necessitates owning or having access to a car. One-third of poor families in nonmetropolitan areas do not own a vehicle of any kind and only 55 percent of the rural elderly own their own cars. Twelve percent of occupied rural units have no automobile available.

—*Scarcity of medical personnel.*—Three fourths of the rural population (35 to 40 million people) live in medically underserved areas (MUA's) (Blackmon, 1979). Designation as an MUA is based on the physical-to-population ratio, the infant mortality rate, and the percentage of the population below the poverty level. As reported in 1978, the ratio of physicians in metropolitan counties (149 per 100,000 population) was nearly twice as large as that in nonmetropolitan counties (77 per 100,000). The ratio of primary care physicians in metropolitan counties was

46 percent higher than in nonmetropolitan counties—51 versus 35 per 100,000 population (U.S. Deapartment of Health, Education and Welfare, 1978a).

—*Lack of appropriate referral services.*—Diagnostic services such as screening clinics (e.g., diabetes, hypertension, glaucoma) and laboratory facilities may not be available in a community unless it has a hosptial. In addition, home health care services are scarce in rural areas. Home health care brings certain Hospital services—primarily bedside care, medications, dressings, observations, and tests—to patients who can be adequately cared for at home. In 1977, 700 rural counties had no home care services available, and in more than 1,000 counties, there was only one nurse to serve the entire county (U.S. Department of Health, Education and Welfare, 1978b). In 1979, less than 2 percent of medicare expenditures went to home health services. Mental Health Services in rural areas are deficient in facilities and personnel. For example, a 1969 National Institute of Mental Health Survey disclosed that more than 96 percent of non-Federal psychiatrists practice in urban areas.

—*Inadequacies in emergency and triage services.*—The fatality rate of rural motor vehicle accidents remains 4 to 6 times that of comparable urban injuries because of inadequate care (Horetchens, 1977). Delays in finding an accident victim, delays in the arrival of ambulance or fire crews, long distances to the nearest hospital, lack of equipment and emergency room personnel to care for the critically injured patient all affect the accident victim's chances of survival.

—*Financial constraints.*—Even when health care services are available in an area, they may not be accessible to members of the community because of the cost. According to 1970 census data, the median income for urban families in 1969 was $10,226. For rural nonfarm families it was $8,244 and for rural farm families only $7,082. These differences are exacerbated by special problems with agriculture-based economies.

Individuals living in rural areas also have less health insurance coverage. In 1976, approximately 41 percent of farm laborers and farm foreman were uninsured. Approximately 19 percent of the people who lived outside SMSA's on farms were uninsured compared with 8.1 percent of persons living in SMSA's but not in central cities (U.S. Department of Health, Education and Welfare, 1980). Additionally, the coverage that rural residents do have tends to be limited. Fewer workers have group insurance policies which have more liberal benefits than individual policies.

Most of the rural poor also do not meet the eligibility criteria for welfare (U.S. Department of Health, Education and Welfare, 1980). Seventy percent of rural poor families are two-parent families compared with 30 percent of poor families in central cities. In 1976, approximately 1 out of 10 residents of central cities within SMSA's were covered by medicaid while less than 1 out of 50 rural farm residents were so covered (U.S. Department of Health, Education and Welfare, 1979). The majority of the rural poor live in the South where medicaid programs are particularly inadequate. For example, in fiscal year 1976 the average payment per eligible AFDC family in Mississippi was $520 compared with $2,010 in New York and $1,080 as a national average. A 1970 household interview survey found that medicaid payments averaged $5 per poor child in rural areas compared with $76 per poor child in central cities (U.S. Department of Health, Education and Welfare, 1978c).

Health status.—The limited accessibility to health care services by the rural population outlined above must be viewed in the context of need. One measure of need for health services is health status. Numerous statistics (for example, greater nutritional deficiencies, higher rates of infant and maternal mortality, higher rates of occupational mortality and morbidity) can be quoted to support the contention that the health status of persons living in rural areas is poorer than that of persons living in urban areas.

In sum, individuals in rural areas face a complex set of problems and situations with which their more urban counterparts do not have to cope. This section has reviewed several problems associated with health care in rural areas: lack of public transportation; scarcity of medical personnel; lack of appropriate referral services; financial constraints; and, poorer health status. In the following section the medical care utilization experiences of individuals in rural areas will be reviewed.

STUDIES OF MEDICAL CARE UTILIZATION

Several studies of medical care utilization in rural areas are of interest here. Kleinman and Wilson (1977) compared the utilization of health resources, accessibility to care, and health status among residents of nonmetropolitan areas designated as medically underserved (MUA's), those adequately served (ASA's) and SMSA's using 1973–74 national health interview survey data. They found little difference in physician utilization between the MUA's and ASA's. Differences did exist among the areas by physician type: 70 percent of MUA visits and 62 percent of ASA visits were to general practitioners compared to 48 percent of SMSA visits. MUA's and ASA's differed most in their utilization. Both MUA's and ASA's appeared to be at a disadvantage relative to SMSA's with regard to obstetrical care. Substantial differences in health status existed between MUA's and ASA's: nearly 20 percent of MUA residents reported fair or poor health compared with 12 percent of ASA residents (and 11.6 percent of SMSA residents).

There were no large differences between MUA's and ASA's concerning reported problems with access of medical care. Seven percent of the MUA residents and 5 percent of those in ASA's reported not getting needed care. They cited appointment difficulties as a major factor and physician availability as less important. The authors noted that these findings on access point out the difficulty of relying on reported problems to identify underserved areas since different levels of expectation may influence the degree of satisfaction with medical care.

Kleinman and Wilson (1977) also found that MUA residents used hospital care appreciably more than ASA residents. The hospital discharge rate for MUA's was almost 20 percent higher than for ASA's, and the number of hospital days per 100 persons was 24 percent higher. The entire difference in the discharge rate was due to nonsurgical cases, with the nonsurgical discharge rate in MUA's

21 percent higher than in ASA's and 49 percent higher than SMSA's. The authors observed that this significantly higher rate indicated that some fraction of the greater need in MUA's was being met by hospital care rather than ambulatory care.

Hassinger and Hobbs (1973) studies four rural Ozark communities with different levels of health services to determine the relationship between availability of health services and patterns of use. They found that while hospitalizations in all four communities increased with age, there was no consistent relationship between hospitalization and income for any of the communities or any of the age groups. Their hypothesis that use of services would be directly related to services available within the communities was not borne out. They concluded that the similar patterns of health services utilization in the four communities showed that there was a common normative pattern of health behavior across the communities.

Luft, Hershey, and Morrell (1976) found that health status and source of care were important predictors of physician utilization in a rural California community. Their results indicated that people were largely using health services in response to need. Those without a regular source of care were much less likely to use any health services. This difference in utilization was only partly attributable to socioeconomic status differences. Income (because of widespread insurance), travel time, and attitudinal and race variables were not important factors in utilization.

They also pointed out that observed utilization is a function not only of the services demanded by consumers, but also of services supplied by the health care providers. Thus, demand should be explained within the context of a given supply, and the availability of care should be considered as one of the primary determinants of differences in utilization, particularly when studying rural-urban differences.

Chaska et al. (1980) addressed this issue of the supply and utilization of physician services in a study in southeastern Minnesota. Their objective was to evaluate whether adding physicians in rural areas makes a difference in utilization of care and patient satisfaction. The initial survey of their study population showed that education and utilization of services were not significantly related. Ten percent of the population consumed about 50 percent of the total physician visits. Heavy users of services were slightly older, were housewives or retired, and more often were female. The mean utilization rate was 3.3 visits per person per year; however, 50 percent of the study population did not contact a physician or made only one contact during the entire year.

With regard to satisfaction with care, persons with an annual income or less than $3,000 were least satisfied with emergency care while those who refused to reveal their income were most satisfied with services. Education was inversely related to satisfaction with care and with availability of physician office visits. Nevertheless, those with more education were more satisfied with physician fees than were the less educated. Overall, satisfaction with medical care among the study population was high.

Kennedy (1980) attempted to identify the determinants of alignment with a regular source of health care in a rural Texas population. The first stage of the study dealt with determining whether the conventional model of physician utilization (which characterizes utilization behavior as a function of need for care, measured by perceived and/or evaluated illness, and sets of factors that predispose and enable the individual to seek care) fit the study population. Physician contact and volume of physician visits were examined in separate multiple regression analyses. The second stage involved identifying the best predictors of alignment with a regular source of medical care.

Nine of the 12 independent variables in the analysis of volume of physician visits explained 52.2 percent of the variance in the dependent variable, with need variables (hospitalization, bed days, and chronic illness) contributing 36 percent of the variance. The next best predictors were: reported satisfaction with quality of medical care, educational level of the individual, and acknowledgment of a regular source of care. Analysis of physician contact within the past year showed that only three of the independent variables contributed significantly to the 19.9 percent of the variance; past hospitalization and sex accounted for 2 percent and 2.9 percent of the variance, respectively.

In the regression analysis of regular source of medical care, only 18.4 percent of the variance was accounted for by the variables examined. This indicated a limited ability to predict whether an individual had a regular source of medical care. Nearly half of the variance was explained by two variables: satisfaction with convenience of care and private insurance coverage. The other significant factors included presence of a chronic health problem, length of residence, sex, and education.

The low proportion of variance explained in this study led Kennedy (1980) to conclude that not much confidence could be placed in the absolute importance of the independent variables. However, she proposed that the relative importance of specific variables suggested the following: (1) Need factors might be considerably less important in determining alignment with a regular source than they are in determining actual utilization; (2) attitudinal factors might be substantially more important in determining alignment; and (3) the lowering of economic barriers to access might not have affected rural populations as much as other populations.

Another study examined hospital utilization rates and compared the pattern of surgery for rural and urban residents in Utah during one year (Kane, 1978). Results showed a striking similarity between these two groups. For most of the 15 procedures studied, at least a third of the rural patients had their operations in urban hospitals. In 3 percent of the cases, urban physicians operated in rural hospitals. General practitioners performed 24 percent of the procedures, with urban GP's performing proportionately more surgery than their rural counterparts. The authors found no clear patterns of difference in fees or length of stay by specialty or board certification status. They concluded that the problem of access to care might be less acute than imagined by many health planners.

Bosanac (1976) examined geographic accessibility to general hospitals by West Virginia residents using a 30-minute travel time standard. More than 10 percent of the entire population and nearly 20 percent of the rural residents lived in areas classified as inaccessible to general hospitals. The "inaccessible population" was characterized by a clustering of sociodemographic attributes that are believed to be associated with both unfavorable health status and high need for hospital and related health services. Relative to the accessible population, the inaccessible population had: (1) A higher proportion of children and elderly; (2) a considerably higher fertility ratio; (3) slightly larger households; (4) poorer housing conditions; (5) substantially lower educational attainment; (6) a mean family income which was 26 percent lower; (7) nearly twice the proportion of families with incomes below the poverty level and 16 percent more of the aged below this level; and (8) almost twice as much unemployment among the adult labor force, and a higher proportion of employed males working in low status occupations. The authors concluded that accessibility, quality, and range of services must be considered as well as the role of the small rural hospital in trying to meet the needs of an underserved population.

In summarizing the problems and studies outlined above, there is evidence for the presence of unmet need for health services among rural residents associated with problems of access and availability. Yet, our understanding of the influence of these factors on utilization has been less than precise because of the diversity among rural areas. In this study, a set of determinants of utilization will be examined both descriptively and then by regression analysis. Additionally, this analysis will be performed controlling for the proportion of urban residents residing in the individual's county. Given the differences among rural areas, this control should provide us with a better understanding of medical care utilization among rural residents.

METHODS

Sampling and variable measurement.—The data for this paper are based on a multistage probability sample of households representing the noninstitutionalized, resident population of the State of Minnesota. Personal interviews were conducted with one individual in each household who provided specific information on the disability experience and utilization of service for each member of the family. Our analysis uses information provided for all family members by these proxy respondents. Interviews were conducted in 2,342 families yielding a response rate of 92.8 percent. The subsample used for our analysis consists of 4,466 individuals 18 years of age or over. The variables used in this analysis are listed in table 4.1.

ANALYTICAL STRATEGY

The previous literature on rural-urban differences in health status and health services has documented a substantial disadvantage for residents of rural areas. Our analysis has three foci: (1) The measurement of the rural-urban distinction as a question of degree rather than a simple dichotomy, (2) the explicit measurement of health resources in the geographical area of interest, and (3) differences in the influence of the determinants of utilization across areas which vary in the degree of rurality.

In terms of the measurement of the degree of rurality, it seems obvious to state that there are qualitative differences across geographical areas. However, it is not clear whether rural-urban differentials in the distribution of health resources arise from such qualitative factors or whether they are influenced by variations in such factors as the relative level of affluence. The data tend to support the latter position in that per capita health resources (for example, number of physicians per 100,000) vary more or less monotonically with population size. Accordingly, we would argue that a simple rural-urban dichotomy not only fails to reveal the diversity of geographical areas but may mask important differences in the factors which influence health services utilization.

Second, our analysis incorporates a direct measure of health services availability, the number of physicians per 100,000 population in the individual's county of residence. Since our analysis focuses on physician utilization, this variable is of substantive interest. Furthermore, it has the advantage of providing a quantitative estimate of the effect of health services availability as opposed to using a proxy variable.

Finally, our primary goal is to examine rural-urban differences in the effects of the determinants of utilization. Our argument is that the known differences in health status and resources constitute structural contexts within which individuals obtain health care. The appropriate unit of analysis is the individual, yet the structural effects must be measured at a higher level of aggregation. We use the county of residence as the aggregate unit since many health services are organized at this level and this is especially true for physician services. Our procedure consists of classifying each individual as to the appropriate county of residence and then matching county-level characteristics to each individual.

In sum, our analysis is a type of "contextual" analysis in which the higher-level variable of interest (physicians per 100,000 population) is explicitly assessed in terms of its importance for individual patterns of utilization. Furthermore, we examine the area differences in the effects of other determinants of utilization to see if they differ in a manner consistent with what is known about the structural characteristics of rural and urban areas. As a general hypothesis, we would propose that individual-level variables which facilitate utilization (that is, health insurance coverage) would be more efficacious in urban areas than in rural areas due to the availability of resources.

RESULTS

Descriptive analysis.—Most work done in the area of rural-urban comparisons has been the result of large-scale data collection methods. Reports of findings of these studies have, in general, been limited to dichotomizing individuals into either urban or rural areas of residence and then providing descriptive reports. In this study, four categories of rurality have been applied to the data. The first category included individuals who reside in counties in which up to 9.9 percent of the residents reside in urban areas. The second category includes individuals who reside in counties where 10 to 49.9 percent of the individuals reside in urban areas. The final two categories include individuals in counties where 50 to 89.9 percent and 90 percent and over of the county residents reside in urban areas. Descriptive statistics are reported in table 4.2.

The data in table 4.2 indicate that clear differences among rural and urban areas existed in Minnesota at the time of the survey. Individuals in the most rural areas visit physicians less than their urban counterparts and are less likely to have chronic health problems or interference in activities of independent living.

Despite utilizing physicians less, rural residents are more likely to identify with a regular source of care. However, it does appear as if rural residents may have significant income and financial barriers due to a lower likelihood of private insurance coverage, public assistance, and a lower family income/family size ratio. Interestingly, a greater number of access problems are encountered by urban residents.

Rural areas are also more likely to be characterized as including individuals who are older, married, and less well educated than individuals in more urban areas. The median income of county residents in rural areas is almost 45 percent of the median income in the most urban counties. Availability of physicians is associated with rurality of a county as the physicians per 100,000 ranges from 55 in the least urban counties to 290 in the most urban counties.

In summary, the individuals in these rural Minnesota counties, when compared with individuals in more urban counties, visit the physician less frequently, have lower income, less insurance and public assistance, are older and married, have lower availability of physicians, yet are more likely to have a regular source of care and to have experienced fewer access problems. In the next section regression analysis will be applied in an attempt to better understand and to integrate the nature of these relationships.

REGRESSION RESULTS

In order to determine the magnitude of the effect of each factor in a set of predictor variables, the log of the number of physician visits during the previous 6 months was regressed on selected independent variables. Examination of the correlation matrix indicated a high degree of multicollinearity among the variables measuring income and adequacy of income and the county level variables. It was decided to include at this stage of the analysis one variable measuring income (the income/family size ratio) and one county level variable (physicians per 100,000 population). The results of the regression performed in each of the four classifications of population areas are displayed in table 4.3.

An examination of the data reported in table 4.3 indicates that the set of independent variables included in this analysis explains 17 percent of the variance in physician visits among individuals in the most rural counties. About 10 percent of the variation in physician visits is explained in each of the other three areas. The corrected $(R)^2$ used for comparison purposes is 0.137 in those areas where less than 10 percent of the population reside in urban areas; 0.096 in areas where 10 to 49.9 percent of the population reside in urban areas; 0.095 in areas where 50 to 89 percent of the population are in urban areas; and 0.097 in the most urban areas. Each of the four models examined achieved significance at the 0.05 level or better.

Assessing the effect of each independent predictor to physician utilization, the presence of a regular source of care, private health coverage, public insurance assistance, marital status, education level, and physician population ratio, it is concluded that none of these factors are significantly related to physician utilization.

The two measures of need for care, presence of a chronic health problem and amount of interference in independent living are found to have effects on the dependent variable. The presence of a chronic health problem is not significantly related to physician utilization among the most rural group, however, its effect increases with the proportion of the county population residing in urban areas. The variable measuring interference in independent living appears to operate in a different fashion since it is significantly related to increased utilization in each of the four groups. The magnitude of its effect appears to be contrary to the effect of the presence of a chronic health problem. Interference in independent living has its greatest effect on utilization among individuals in the most rural areas.

Among the measures of socioeconomic status, increasing age is associated with greater numbers of physician visits among the rural, and, while having no significant effect in the more urban groups, its sign is in the opposite direction, associated with fewer physician visits. Females experience more physician visits than males in all areas, but the effect of being female is greatest among the most rural group.

The income ratio (per capita income) has a change in sign and significance between the two urban and two rural groupings, although not significant in the two urban groups. The sign of this variable is negative. Examining the two urban groups, per capita income is significant and associated with a higher level of physician visits.

DISCUSSION

The finding that physician availability did not significantly affect the level of physician visits is interesting, especially in light of the wide differences in physician availability among rural and urban counties. It might appear that individuals, regardless of where they live, become accustomed to the given structure of the health delivery system in their area. If this is the case, long travel times and distance may be unacceptable to urban residents but acceptable, if not a way of life, for rural residents. As a result, the impact of accessibility and availability factors in rural areas may be minimal, as was found in this analysis.

Interference in independent living was found to be associated with increased physician utilization and the magnitude of this effect increases as the proportion of individuals residing in urban areas decreases. Per capita income was associated with increased physician visits in more urban counties and with fewer visits among individuals in rural counties.

This complex pattern of relationships does have implications for the design of health delivery systems. It appears as if rural residents may be more sensitive to changes in availability and accessibility, especially those rural residents with interference in independent living. These individuals make more visits to the physician as interference increases. Also among individuals in those counties which are moderately rural, (10 to 49 percent of the population in rural areas) increases in access problems are associated with increased utilization. These two findings suggest that there may be some middle ground within which consideration of cost, access, and availability are balanced. Once this balance is tipped, then considerations of either organization of health delivery or cost considerations become predominant. Such an implication is suggested by Dutton (1978) in her study of the poor.

Among residents of more urban counties, increases in per capita income were associated with increases in physician visits, while the opposite was true for individuals in rural counties. These findings suggest that the nature of the inadequacies of the delivery systems, whether they be organizational or reflected in the availability of resources be included in future studies. It may be that the individual determinants are not the important factors in utilization; rather, the individual responses to the structure of the system may have direct impact on physician utilization.

REFERENCES

Blackmon, D. "Rural Health Care." *Alabama Journal of Medical Science,* 1979, 16, 1, 60-66.

Bosanac, E., Parkinson, R., and Hall, D. "Geographic Access to Hospital Care: A 30 Minute Travel Time Standard," *Medical Care,* 14, July 1976, 641.

Congressional Rural Caucus, *Report on Issues, Problems, Recommendations for Action, and Conclusions as to what the Congress and Administration Can and Should Do for Rural America."* Washington, D.C.: White House Conference on Balanced Growth and Economic Development, 1977, p. 47.

Dutton, D. "Explaining the Low Use of Health Services by the Poor: Costs, Attitudes, or Delivery Systems." *American Sociological Review,* 43, June 1978, 348-368.

Guillozct, N. "Community Mental Health—New Approaches for Rural Areas Using Psychiatric Social Workers." *Medical Care,* 13, January 1975, 59-67.

Hassinger, E., and Hobbs, D. "The Relation of Community Context to Utilization of Health Services in a Rural Area," *Medical Care,* 11, 1973, 509.

Horetchens, B. "Initial Evaluation and Management of Major Trauma in the Rural Setting: An Appeal for a National Standard," *Legal Aspects of Medical Practice,* December 1977, 38-44.

Kane, W. "Rural Health Care," *Journal of American Medical Association,* December 8, 1978, 647-650.

Kennedy, V. "Locational Aspects of Medical Care-Seeking in a Rural Population, with Some Implications for Public Policy Research." *Journal of Health Politics, Policy, and Law,* 6, Spring 1980, 142-151.

Kleinman, J., Wilson, R. "Are 'Medically Underserved' Areas Medically Underserved?" *Health Services Research,* 12, 1977, 147-162.

Kovar, M. "Health of the Elderly and Use of Health Services," *Public Health Reports,* 92, January/February, 1977, 9-20.

Luft, H., Herschey, J., and Morrell, J. "Factors Affecting the Use of Physician Services in a Rural Community," *American Journal of Public Health,* 66, September 1976, 875-871.

Reilly, B., Legge, Jr. J. and Reilly, M. "A Rural Health Perspective: Principles of Rural Health Policy," *Inquiry,* 17, Summer 1980, 120-127.

U.S. Department of Agriculture, The Economic and Social Condition of Rural America in the 1970s. Washington, D.C.: Agriculture Information Bulletin No. 362, 1973.

U.S. Department of Agriculture. *Health Care in Rural America.* Washington, D.C.: Agriculture Information Bulletin No. 428, July 1979.

U.S. Department of Health, Education, and Welfare. *Report of the ADAMHA Manpower Policy Analysis Task Force: Vol. II.* Washington, D.C.: Alcohol, Drug Abuse, and Mental Health Administration, 1978a.

U.S. Department of Health, Education, and Welfare. *Report to the President on the Status of Health Professions Personnel.* Washington, D.C.: Publication Number (HRA) 78-93, 1978b.

U.S. Department of Health, Education, and Welfare. *Data on the Medicaid Program: Eligibility, Services, Expenditures, Fiscal Years 1966-1978.* Washington, D.C.: Publication No. (HCFA) 78-24523, 1978c.

U.S. Department of Health, Education, and Welfare. *Health Care Coverage, United States, 1976.* Washington, D.C.: Advance data No. 44, September 20, 1979.

U.S. Department of Health, Education, and Welfare. *Health United States 1979.* Washington, D.C.: Publication Number (PHS) 80-1232, 1980.

Wiles, M. "Ruralism, Poverty, and Old Age," Paper presented at the 32nd Annual Scientific Meeting of the Gerontological Society, Washington, D.C., November 25, 1979.

Wright, D. "Recent Rural Health Research." *Journal of Community Health*, 2, Fall 1976, 60-72.

Table 4.1: Operationalization of Variables

Dependent Variable	
Physician Visits	Log of number of physician visits during 6 months prior to interview.
Independent Variables	
Chronic Health Problem	0 = no chronic health problem, 1 = otherwise.
Independent Living Index	0 = no restriction on activities, 1 = difficulty with walking, deafness, or blindness, 2 = unable to use public or private transportation, do housework or yardwork, or unable to work for pay because of disability.
Regular Source of Care	0 = no regular source of medical care, 1 = otherwise.
Health Insurance	0 = no health insurance coverage, 1 = otherwise.
Public Assistance	0 = no public assistance, 1 = otherwise.
Access Problems	Total number of access problems (health care delayed or prevented by lack of physician, cost, no knowledge of source, lack of transportation, office hours, office closed, or "other" reasons. Range = 0 to 7.
Age	Actual age in years.
Sex	0 = female, 1 = male.
Marital Status	0 = female, 1 = male.
Education	Years of completed schooling.
Income Ratio	Total annual family income divided by number of family members.
Physician Ratio	Number of physicians per 100,000 population in individual's county of residence.

Table 4.2: Means for Variables in the Analysis by Percent of County Population Living in Urban Areas

	Percent of County Population in Urban Areas			
	0-9.9%	10-49.9%	50-89.9%	90%+
Physician Visits[1] (Log)	.43	.50	.50	.57
Chronic Health Problems[1]	.10	.10	.11	.16
Independent Living Index	.18	.17	.18	.20
Regular Source of Care[1]	.92	.96	.92	.84
Health Insurance[1]	.87	.93	.93	.91
Public Assistance[1]	.04	.04	.03	.07
Access Problems[1]	.06	.09	.10	.16
Age[1]	47.8	45.1	42.4	42.0
Sex	.49	.49	.49	.47
Marital Status[1]	.72	.74	.71	.62
Education[1]	11.2	11.6	12.4	13.0
Income Ratio[1]	$3976	$4300	$5325	$6121
Physician Ratio[1]	55	79	199	290
Percent Hospital Occupancy[1]	.73	.59	.68	.72
Median Income of County of Residence[1]	$6750	$8092	$10315	$11647
N	342	1342	1192	1590

Note: Ns used in the analysis may differ slightly due to missing data. The final two variables are not used in the regression analysis because of multicollinearity.

[1] Indicates significant differences by percent of population in urban areas: $p < .05$ (F test).

Table 4.3: Regression Analysis of Physician Visits

Independent Variable	Percent of County Population in Urban Areas 0-9.9	10-49.9	50-89.9	90+
Chronic Health Problem	.119 .267 (.157)	.174*** .408 (.070)	.197*** .429 (.067)	.199*** .378 (.051)
Independent Living	.210** .262 (.081)	.133*** .183 (.042)	.141*** .185 (.042)	.140** .175 (.037)
Regular Source	.057 .143 (.150)	.036 .078 (.063)	.053 .136 (.077)	.039 .062 (.042)
Health Insurance	.025 .054 (.127)	.012 .033 (.079)	.039 .109 (.086)	.014 .033 (.070)
Public Assistance	-.066 -.215 (.196)	-.004 -.015 (.104)	.043 .171 (.122)	.038 .101 (.073)
Access Problems	-.024 -.038 (.094)	.115*** .161 (.040)	.021 .023 (.032)	.044 .046 (.028)
Age	.080 .003 (.003)	.071* .003 (.001)	-.040 -.002 (.001)	-.003 -.000 (.001)
Sex	-.236*** -.317 (.080)	-.088** -.123 (.039)	-.123*** -.169 (.041)	-.098*** -.136 (.036)
Marital Status	.099 .149 (.092)	.012 .018 (.046)	.052 .078 (.046)	.025 .035 (.038)
Education	.038 .009 (.017)	.031 .008 (.008)	-.062 -.015 (.008)	.008 .002 (.007)
Per Capita Income	-.039 -.000 (.017)	-.024 -.000 (.000)	.007* .000 (.000)	.113*** .000 (.000)
Physician Population Ratio	.028 -.001 (.002)	-.017 -.000 (.001)	-.026 -.000 (.000)	-.028 -.001 (.000)
R^2	.167	.104	.103	.104
$\bar{R}^2$	.137	.096	.095	.097
N	342	1342	1192	1590

* p .05
** p .01
*** p .001

NOTE: Upper coefficient is standardized partial regression coefficient; lower coefficient is unstandardized (metric) partial regression coefficient. Standard errors shown in parentheses.

SECTION B—THE PROVISION AND EVALUATION OF RURAL HEALTH SERVICES

EVALUATION OF A PROGRAM FOR COMPREHENSIVE HEALTH IMPROVEMENT IN THREE RURAL COUNTIES

This paper evaluates the performance of the University of Florida's comprehensive health improvement project (CHIP) during the first 15 months of its operation. The purpose of CHIP was to demonstrate the impact of a program of community health education and chronic disease control in a sparsely populated low income rural area composed of three adjacent counties in north central Florida. With a combined population of 17,600 people, these counties have limited facilities and personnel for preventive and primary medical care. High mortality rates from accidents, cardiovascular disease, and respiratory cancer and high rates of venereal disease and pregnancy among teens were observed throughout the early and mid-1970's in one or more of the counties, suggesting that a considerable proportion of morbidity and mortality in the three counties was related to lifestyle and inadequate preventive care.

Three partially federally funded primary care centers, one in each country, provide for the medical needs of citizens. At the inception of the CHIP project the focus of these centers was almost exclusively on curative medicine. Except in one county where the primary care center and county health department share quarters, there was little integration or coordination of activities between the county health departments and the primary care centers. Educational levels of the adult population in the three counties are markedly lower than the State average; while 53 percent of Florida's population have completed high school only about 33 percent of adults in these countries have done so. School health education was minimal or nonexistent in three counties. Although each county has a weekly newspaper, there are no daily papers or broadcast stations located within the three counties. Thus, media coverage of local health issues and problems is very limited.

GOALS AND STRUCTURE

Within this context the goals of the CHIP project were to (1) identify and bring into the treatment system those individuals at risk from chronic debilitating disease or accidents; (2) raise general levels of awareness and knowledge about the impact of lifestyle on health (that is, smoking, stress, diet, exercise, safety precautions, alcohol consumption); (3) provide and/or arrange for the provision of programs aimed at modifying lifestyle; (4) increase cooperation between the county health departments and primary care centers; and (5) increase the proportion of primary care center services devoted to prevention Special emphasis was to be placed on individuals at risk from ardiovascular disease, accidental death or disablement, teenage pregnancy and veneral disease.

The delivery of services in CHIP was built upon four key settings available in most rural counties of Florida: primary care centers, county health departments, private business and public schools. Federal and State programs have increased significantly the number of primary care centers in rural Florida. In each county in Florida there are county health departments which discharge numerous functions related to public health, prevention and health education. Often their activities are carried out without reference to overlapping or complementary activities conducted in primary care centers of public schools. Health education in the schools often receives inadequate attention because of time demands from other facets of the curriculum and because of a lack of interest on the part of faculty and administrators. The need to unify the health functions provided in these settings seemed especially obvious in these rural communities with their documented health problems. Finally, private businesses had an obvious need for health and safety education for their employees and provided a vehicle to reach some of their customers who might not be regular users of the health or educational systems.

The project staff consisted of a full time health educator, a full time public health nurse, a part time (8 hours per week) physician administrator/supervisor, and a part time (8 hours per week) evaluator. Services were provided primarily in the community settings such as businesses, schools and shopping areas, with minimal use of the health department and primary care center facilities for risk reduction activities.

METHODS AND ANALYSIS

Evaluation of the project was based on information collected through participant observation and on management data showing the allocation of staff time (measured in person/days) and personnel costs. The full time services delivery staff kept a daily log of their activities from the first day of the project. Cost data were provided through routine cost accounting at the University of Florida, and are composed of three major categories: personnel costs, travel costs, and materials costs.

Daily logs were analyzed and each activity was assigned to a major category according to the type of program which was being planned or delivered. These data were used to calculate the number of person/days devoted to each category of activities. Personnel costs were then attributed to activities using the cost per person/day of each different type of project staff person involved in conducting a given activity.

Travel costs were divided among the actual services on the basis of the number of trips required to deliver each type. Materials costs were divided evenly among the activities in which they were used in acknowledgment of the multiple uses of much of this material.

FINDINGS

Community development.—The primary use of participant observation was to study the community development aspects of the CHIP implementation. The three counties involved in the project have cooperated with the University of Florida College of Medicine for 5 to 10 years in order to provide primary medical care to their citizens. Nevertheless, there remained a relatively high level of suspicion about outsiders and university people entering the schools, businesses, churches, and other community settings.

Early planning and recruitment for CHIP recognized this concern on the part of the counties' citizens. The project went to considerable effort and delay in recruiting in order to employ key personnel who were familiar with the communities and their health problems. The project was fortunate to be able to identify a health educator who had worked in two of the rural schools (although not residing in any of the counties) and a public health nurse who had been living in one of the counties for several years. This helped to remove the perception of this project as a group of outsider or academics who wanted to come in and tell us how to run our communities.

In addition, the project staff decided from the very beginning to work through the communities' leaders rather than bypassing them. This eventually proved to be a good idea although it initially seemed frustrating and time consuming. Two of the three high school principals at first refused to allow the CHIP staff to conduct risk factor assessments or health risk reduction programs in the schools. The third principal did agree to allow the program on a trial basis. As the program was implemented and enthusiasm for it grew the other schools began to reconsider. This process was accelerated because the high school science teacher in whose classroom the risk reduction program was implemented was a member of the board of education in the neighboring county (where he lived). Furthermore, the public health nurse in the county where the risk reduction program was implemented was the spouse of the superintendent of schools in that neighboring county. Thus, before the program had been completed in the first county the principal in the neighboring county had called to state that he now wished to have the program in his school. This is one example of the "mushrooming" of activities and the importance of personal contacts with community leaders which existed throughout the project's first 15 months.

The projects' goals and staff were not equally well accepted in all three counties. In the smallest county, in which neither staff member had worked previously, the project received little initial acceptance. This community, though statistically very similar to the other two communities, views itself as superior to its neighbors. The high school principal in this county refused to allow risk factor assessment because it contained questions about sexuality and because it implied that carrying knives and guns was a risk inducing behavior. Leaders in the community pronounced that no problems with drugs, liquoir, VD, or teenage pregnancy existed. Consistent with its philosophy of offering assistance but not forcing programs on anyone, the project initially concentrated its activities in the other counties, but continued to offer this county each service offered to its neighbors. Gradually, the public health nurse and school officials in this reluctant county lost their initial skepticism and concern about the project and agreed to allow participation.

Community development experiences reaffirmed again some well documented observations: people are unlikely to accept services for which they perceive no need; and informed contacts, friendships, and the perception of service providers as insiders rather than outsiders are keys to gaining acceptance of new and innovative programs in rural communities.

Project activities.—Activities of the project can be divided into two major categories: screening and risk reduction. The first of these categories includes screening for chronic diseases, risk factor assessment, (that is, screening for risk factors) and well child care activities performed in conjunction with the school system. The second major category includes general health and safety education activities and specialized activities aimed at specific health problems (for example, CPR training or smoking cessation clinics). Figures 5.1 and 5.2 list the screening activities and risk reduction activities provided or coordinated by the project during the first 18 months of its operation.

Figure 5.1 indicates that screening services were provided to 1,948 individuals during the first 15 months of the project. Several of the screening activities were done in conjunction with the county health departments and thus represent cooperation in addressing county health department goals rather than CHIP goals. For example, State law requires that scoliosis screening be provided by the county health departments in each county. However, small staffs and excessive paperwork loads rendered such screening impossible in these small counties. Cooperation with the health department not only allowed them to conduct scoliosis screening, but provided a quid pro quo—that is, county health department staff to cooperate in a major hypertension screening program.

A total of 1,136 indiviuals received blood pressure screening services during the first 15 months of the program. Of these individuals, 129 were referred for followups of abnormally high blood pressure readings. Of these people, 92 presented new cases of hypertension.

Health education activities related to cardiovascular disease prevention and emergency care of the heart attack patient (CPR training) included items 2, 4, 10, 11, 13, and 15 listed in figure 5.1 and served 97 people. Most notable was the training of 23 employees of a local lumber mill in cardiopulminary resuscitation [CPR]. This employee group was made up in large part of middle-aged males and several employees of the mill had experienced heart attacks on the job. Educational material on cardiovascular disease was also provided at each of the blood pressure screenings. Health education activities related to teenage pregnancy and veneral disease were worked into parenting education classes taught in the rural health departments on obstetrics clinic days. Previous studies have shown teenage mothers to be at especially high risk of additional unwanted pregnancies and at higher risk of contracting venereal disease than other patients. These programs provided information to 160 women.

In addition to the health education activities already listed, several major activities took place which addressed multiple lifestyle related topics. The 4-H for L.I.F.E. Program offered to all 140 ninth graders in one of the county schools included 30 day-long sessions with components of safety (auto safety, accident prevention, first aid) cardiac disease (smoking, nutrition, exercise) and sex education (general knowledge, venereal disease, pregnancy, values). Similarly, the program of limbering exercises provided for senior citizens stressed overall wellness and fitness and discussed the importance of nutrition and exercise in a program of health promotion.

During 1981, the CHIP staff edited and published two issues of the "Health Letter" and mailed it to 6,830 homes in the 3 counties. Since virtually all residents of the counties have a post office or rural route box, this health education activity had the potential of reaching every resident of the three counties except the few who call at the post office for general delivery mail.

Direct health education activities were provided to a more limited subset of residents. Accident prevention and treatment activities included items 1, 3, 5, 7, 17, 18, and 19 in figure 5.2. They were provided to at least 559 individuals through a series of classes. In addition, an unknown number of residents visited the display and received educational material on tractor safety at the Suwannee River Fair. Finally, a version of the Canadian Government's self-scored lifestyle appraisal was provided to 100 senior citizens who visited the CHIP booth at a health fair.

In summary, direct health education activities were provided to over 1,000 people, and many of these people received multiple sessions of health education; 6,830 households received indirect health education through the "Health Letter."

Project costs.—Because the CHIP project was a pilot/demonstration project it bore unusually high costs for administration, planning, community development, and evaluation. Thus, calculations of the cost per unit of service which included these startup costs would overestimate the cost of an ongoing program. These costs included administrative costs such as the personnel time to prepare lengthy quarterly and annual reports for the funding agency, recruitment costs for services delivery personnel, the cost of time and materials to assemble the health education program and the cost of community development activities such as coordination and assistance for nurses working in primary care clinics or the county health departments. These startup costs and special costs for the demonstration program are included in section A of Figure 5.3, but have been excluded when calculating the costs shown in sections B and C of that figure.

Screening activities, shown in section B, proved to be relatively inexpensive on a per person basis. Blood pressure screening cost slightly less per person screened than did other types of screening. However, when costs per person referred as a result of screening is compared, the results change considerably, reflecting the higher prevalence of hypertension relative to the other diseases for which the project screened. Costs per person referred as a result of blood pressure screening were $62.59 versus $199.18 for other types of screening activities.

The cost per unit of risk reduction services varied with the duration and sophistication of services provided. The "Health Letter" was produced at a minimal cost, but represented an indirect effort to make information available to the community. The most intensive program was the high school risk reduction program which involved 30 weekly sessions and had a per student cost of $67.75. Community health education programs such as farm safety, stop smoking, and weight loss clinics had a low cost per person in part because they were largely conducted during evening hours and made considerable use of volunteers to deliver services.

The total cost of operating the program during its first 15 months was $85,028. The cost per citizen of the three county project area was $4.83, where the cost per individual receiving one or more direct services from the project was $38.40. The same package of services was delivered during the second 15 months of the program for $53,125 or approximately $3,540 per month as a result of the elimination of startup and most administrative costs. Thus, the cost per citizen to operate an established program at the same level of services (without minimal evaluation and report writing) was approximately $3, and costs per person receiving direct services dropped even more as the staff delivered services more efficiently and community development efforts were replaced by service delivery.

BENEFITS

While the costs of a project of this type are easily quantifiable, the benefits are not as easily measured. Much of the lifestyle change this project seeks to promote is designed to produce long range reductions in morbidity and mortality which may not be observable during the early years of the project. Nevertheless, examination of observed effects provides some information on the project's impact.

Ninety-two previously undetected cases of hypertension were referred for treatment and followup as a result of this project. Assuming that half of these individuals would have otherwise not learned of their hypertension and that of these 46 persons half will have effective blood pressure control (fairly conservative estimates) we can state that 23 people will achieve effective hypertension control as a result of the screening procedures and followup. Control of hypertension has been shown to decrease mortality per 1,000 population by a factor of from 12-26 percent in middle-aged men. (Comparable figures for other ages and for females are not available.) Decreased blood pressure also reduces risks of stroke and kidney disease. The total cost of blood pressure screening represents a fraction of the cost of maintaining one kidney dialysis patient for 1 year or treating and rehabilitating one heart attack or stroke patient. A 1978 study estimated that each untreated hypertensive generated $250 per year in medical costs and $794 per year in lost wages due to avoidable illness or premature death. If these figures are valid, they suggest that the economic benefit of successful blood pressure therapy for 23 persons is slightly over $24,000 per year.

Direct measures of economic benefit for other programs are more difficult to measure. Twenty-three ninth graders began wearing seatbelts when riding in cars after their risk education classes. Ten more reported wearing seat belts more than 75 percent of the time. One study has estimated that savings to the Nation from seatbelt compliance would average slightly less than $100 per citizen. The savings in a rural area where more miles are driven at higher speeds than the national average might be greater. Assuming that these 10 individuals continue to wear seatbelts, it seems reasonable to conclude that the benefit from this one aspect of the risk reduction program alone is $1,000 per year for many years to come. Benefits of changes in breast self-examination habits among ninth grade females are harder to quantify. The number of females reporting monthly self-exams increased from 6 (9 percent) to 31 (49 percent). The immediate cost benefits of this behavior change are probably negligible as teens are at relatively low risk from breast cancer. However, the long range benefits, if this habit is maintained into middle adulthood, could be substantial and seem likely to produce decreased morbidity, mortality, and health care system costs.

Other benefits, which cannot be easily quantified include: (1) increased efficiency in operating rural health centers and health departments (for example, State mandated scoliosis screening had not been carried out prior to this project because county health units were understaffed and overburdened with clinical duties and administrative trivia); (2) improved quality of life for many people (for example, the senior citizens involve in limbering exercise classes reported decreased arthritis pain, and increased ability to perform daily tasks); (3) increased self-care and first aid skills (for example, junior paramedic and CPR training increased the abilities of rural citizens to deal with trauma and heart attacks—these skills are especially likely to be important in areas where long distances produce slow emergency unit responses); (4) improved cooperation among county health units, schools, and the three rural health centers; and (5) altering the focus on health care on the part of faculty and trainees in the rural health centers from curative to a more appropriate mixture of preventive and curative medicine.

Data for 1978 showed an average annual cost per person in the United States of $341 for hospital care and average per capita total health expenditures of $753. Of these costs, 54 percent of hospital costs and 39 percent of total costs were paid from public funds. Costs in 1982 are even higher though the public share may have declined slightly. Without adjustment for inflation, the total expected health care costs for 17,600 residents of the three counties based on 1978 data would be $13,253,000. Hospital expenses alone would be expected to approximate $6 million per year. Thus, the cost of providing an intensive program of risk reduction and screening like CHIP represents approximately 0.4 percent of total health costs. If an ongoing project of this type produced a reduction in health costs of 0.4 percent or more per year it would be cost beneficial to operate. Reduction of public expenditures (a more narrow definition of costs benefit) would require a reduction in total costs of health care of approximately 1.03 percent or more. Neither of these estimates, it should be remembered, take into account changes in worker productivity or tax revenues due to increases and decreases in morbidity and mortality.

CONCLUSIONS AND IMPLICATIONS FOR POLICY

The first fifteen months of the CHIP project have demonstrated that a project of this type can be accepted in rural communities, and that a staff of two full-time service providers can provide a large number of screening and risk reduction programs. An ongoing program, similar to the CHIP project, could serve from 3 to 5 rural counties at approximately the same cost. Such projects could be based in State health districts and should operate with sufficient autonomy to avoid diverting efforts to more routine public health programs. Currently rural county health departments must struggle to provide clinical services while completing a variety of required forms and reports. Few rural settings can muster the resources to provide a program of this type. However, a program such as the one described above could provide services in rural counties at a relatively modest cost compared to other State health programs.

Based on the costs of the CHIP Program, it seems unlikely that a similar risk reduction program could operate on a proprietary basis in the rural South. This may be possible in an affluent suburban or urban setting, but such a project cannot support itself from user fees in poor rural areas because: (1) Poor people lack disposable income to spend on preventive care; (2) publicly funded third party payments (for example, medicare and medicaid) do not pay for preventive care; (3) investments in prevention require a future orientation which is lacking among large numbers of poor people (indeed, one purpose of the CHIP project was to instill this orientation with regard to health); and (4) the costs of delivering services may be higher than in a suburban area, (that is, driving costs and taking services to people raise program costs).

Finally, the experience in these counties reinforces the observation that the public health plagues of the late 20th century are related to environment and lifestyle. Smoking, alcohol abuse, poor nutrition, inadequate safety, lack of preventive care, and environmental degradation produce the diseases that kill, maim, and raise health costs today. Traditional county health unit services are designed to prevent communicable diseases. This is necessary, but no longer sufficient, to promote a healthy population. Projects modeled after CHIP, which address 20th century plagues, are a necessary part of modern public health programs. Such efforts require cooperation among medical providers, medical educators, health units, and the State agencies who coordinate health programs and, wherever county populations are small, should be provided on an areawide basis rather than a single county basis.

Figure 5.1: Screening Activities of the Florida Comprehensive Health Improvement Project (March 1980 - June 1981)

Specific Screening Activities	Number of People Served
1. Scoliosis - March 13-14, 1980, Trenton, Grades 5-10 (9 referred)	143
2. Scoliosis - March 27, 1980, Bell, Grades 5-10, (7 referred)	118
3. Blood Pressure - March 20-21, 1980, Suwannee River Fair and Livestock Show, Fanning Springs, (18 referred)	140
4. Blood Pressure - April 2, 1980, Georgia-Pacific Lumber Mill, Cross City, (9 referred)	73
5. Blood Pressure - April 9-11, 1980, Black Section, Cross City (8 referred)	65
6. Tuberculosis - April 9-11, 1980, Black Section, Cross City, (3 referred)	27
7. Blood Pressure - May 16, 1980, "Piggly-Wiggly" Grocery, Cross City (14 referred)	88
8. Blood Pressure - May 17, 1980, "Akin's Grocery", Bell (5 referred)	54
9. Blood Pressure - May 30, 1980, "Croft's Thriftway" Grocery, May (3 referrals)	45
10. Blood Pressure - September 24, 1980, Dixie County High School 9th Grade, Cross City (no referrals)	140
11. Blood Pressure - November 4, 1980, Six voting pre-clinics in Dixie, Gilchrist and Lafayette counties (65 referred)	473
12. Blood Pressure - January 20, 1981, A.A.R.P. in Trenton (2 referred)	19
13. Scoliosis - January 21, 1981, Trenton, Grades 5-12 (8 referred)	206
14. Scoliosis - January 22, 1981, Bell, Grades 5-12, (6 referred)	178
15. Blood Pressure - March 19, 1981, Health Fair in Chiefland (14 referred)	18
16. Blood Pressure - April 8, 1981, Tri-County Citizens Center (1 referred)	21
17. Headstart developmental screenings with Dixies County Health Department	--
18. Heart screening at Dixie County Health Department	--
19. School health screenings with Dixie County Health Department for Grades K-12	--
20. Risk factor appriasal for all Dixie County ninth graders	140
Total Number of People Served	1,948

Figure 5.2: Risk Reduction Activities of the Florida Comprehensive Health Improvement Project (March 1980 - June 1981).

Specific Risk Reduction Activities	Number of People Served
1. Farm tractor safety display and film on tractor safety--Suwanee River and Livestock Show, March 20-21, 1980, Fanning Springs	—
2. Taught CPR class to Georgia-Pacific employees in Dixie County with help from American Heart Association	23
3. Offered tractor safety program and film to 4th and 5th grade 4-H groups at Lafayette County Grade School.	50
4. Taught weight control/nutrition class over 10-week priod with help from Lafayette County Extension Office; during the course of the class we distributed materials developed by IFAS as well as those researched on my own.	10
5. Taught a beginner swimming class to two-year olds in Dixie County with help from the American Red Cross.	6
6. Parenting education in rural health departments (on OP clinic days)	160
7. Offered two first aid courses in Cross City at the Vocational School and for the residents of Jena and Steinhatchee at the Grade School in Steinhatchee.	33
8. Began the 4-H for LIFE health hazard appriasal for teens in Dixie County High School with all 9th graders.	140
9. Organized a drug education program with the help of the corner Drug Store in Gainesville for concerned parents in Dixie County.	—
10. Conducted a class on the importance of exercise for beauty contestants for Miss Lafayette County.	20
11. Presented a talk to the AARP in Trenton on heart attacks, strokes, and their prevention; used materials from the American Heart Association.	20
12. Limbering exercise program for Senior Citizens at the Tri-County Senior Citizen Center in Cross City, October through June.	15
13. Offered a Smoking Cessation Clinic in Lafayette County during February and March 1981, using materials and guidelines from the Florida Lung Association and American Cancer Society.	6
14. CHIP has responsibility for organizing the Health Letter, which is distributed to all post office boxholders in Dixie, Gilchrist, and Lafayette Counties.	17,600
15. Patient education programs on smoking and health were conducted at CHS and pediatric clinics at Dixie County Health Department in Cross City.	18
16. Set up a booth at a Health Fair in Chiefland which was sponsored by the Tri-County Council on Aging, and included residents from Dixie, Gilchrist and Levy Counties. We administered a self-scoring lifestyle appraisal questionnaire.	100
17. Offered a safety education program to 7th, 8th and 9th graders at Dixie County High, Trenton High and Bell High Schools.	220
18. Offered an abbreviated version of the Junior Paramedic Program to 4th, 5th and 6th graders at Trenton Grade School.	250
19. Offered a Standard First Aid Instructor course to members of the Dixie County Ambulance Service and Cross City Correctional Institute personnel.	7
20. Supervised two students from the Department of Health Education and Safety (University of Florida) working with C.H.I.P. as interns	—

Figure 5.3: Estimates of Costs and Costs Per Person Served for Various Program Activities of the Florida Comprehensive Health Improvement Project

Specific Program Activities	Component Costs	Total Costs	Cost Per Person Served
Section A. Administration, Planning Development Activities			
1. Evaluation and Administration (special cost for demonstration project).			
personnel	25,797	25,797	
2. Health Education Personnel startup costs (first year costs only)			
personnel	6,106	6,106	
3. Nursing Coordination with rural clinics, county health departments, home health agencies			
personnel	6,290		
travel	889		
		7,179	
Section B. Screening Activities			
1. Blood Pressure Screening			
personnel	7,184		
travel	889		
		8,073	7.10
2. Other Screenings			
personnel	5,684		
travel	889		
		6,573	8.09
Section C. Risk Reduction Activities			
1. Health Letter			
personnel	660		
printing and mailing	2,188		
		2,848	.16
2. Community Health Education/Risk Reduction Programs			
personnel	8,553		
travel	889		
materials	2,052		
		11,494	27.50
3. School Safety Education			
personnel	4,533		
travel	889		
materials	2,052		
		7,474	14.37
4. High School Risk Factor Assessment and Risk Reduction Program (30 weeks)			
personnel	6,543		
travel	889		
materials	2,052		
		9,484	67.75

MARKET STRUCTURE AND OUTCOME FOR VOLUNTEER AMBULANCE SERVICES

The delivery of emergency medical servies to rural people is both difficult to organize and expensive to maintain. Rural communities are often unable to overcome a tradition of self-sufficiency and independence to combine and accumulate sufficent resources in terms of money and manpower to support an emergency medical service system over a fairly large but sparsely populated area (Carlson, Lassey, and Lassey, 1980; Perry, 1976). Although the Emergency Medical Services Act of 1973 (Public Law 93-154) and subsequent amendments helped many communities secure equipment and train people, the logistics of the situation suggest that rural services may have difficulty meeting various planning standards and expectations (Gibson, 1978; Perlstadt and Kozak, 1977; Waller, 1973). Emergency medical services must be continuously available, but small towns and rural areas may not have the population base to generate enough emergencies to justify a full-time 24-hour service (Stevenson, 1971).

For most of the 20th century, the center of attention has been on the growing industrialized urban areas and the expansion of urban based human services while the rural areas have been left behind or alone (Romer, 1976). But during the past 10-15 years a remarkable turnaround has occurred. First, many rural areas are now the fastest growing sections of the country (Beale, 1975; Wardwell, 1977). While many urban to rural migrants are willing to give up some of the so-called conveniences of urban settings, they want to improve the quality of rural life and remedy problems of inadequate human services (DeJong and Sell 1977; Ploch, 1978). In the search for resources, programs have shifted from the public to the private and voluntary sectors (Murrin, 1982). In this respect the volunteer ambulance service is a logicial solution to the problem of delivering emergency medical services to rural people.

In an earlier study, Perlstadt and Kozak (1977a) analyzed data on licensed ambulances and registered attendants provided by the Michigan Department of Public Health. About 14 percent of all ambulance services in Michigan were operated by volunteers, although volunteers accounted for over 25 percent of the registered ambulance attendants in the State. The volunteer services tended to be located in small towns and villages (the median population was 1,000) with only 2 towns larger than 8,000. The data indicated that volunteer ambulance services had more attendants per company and per ambulance than other types of ambulance services suggesting a community or social aspect to the volunteer corps beyond the mere provision of services. The findings also revealed that local government affiliation or sponsorship of volunteer ambulance service resembled, from an organizational perspective, the regular public and fee-for-service ambulance companies found in larger urban areas in terms of attendants per company, retention rates, and training levels. In sum, local government sponsorship of volunteer services was associated with better manpower utilization.

These conclusions led to the present study which began with a reexamination of the organizational and economic literature. Over the past 20 years, sociological and economic research in organization structure and process has concentrated on four sets of variables: (1) The organizational environment; (2) the size of the organization; (3) interorganizational linkages; and (4) market structures. Researchers investigating organizational environment found that successful organizations tended to have internal structures that were congruent with environmental demands (Lawrence and Lorsch, 1977). The relationships between size and organizational characteristics such as formalization, centralization and professionalization appear curvilinear and refute the notion that as organizations grow in size they become more and more bureaucratic (Blau and Schoenherr, 1971). Inquiry into the growth and development or interorganizational linkages revealed a web of organizational role sets, domains, and exchange networks. Organizations are likely to link up with other organizations that have complimentary resources or different goals since this would lessen conflict while providing support and permitting each organization to maintain its autonomy (Aiken and Hage, 1968).

The recent interest in market structure, particularly competition, has revived the area or economy of industries. Some have argued that oligopoly is a prevailing market structure (Scherner, 1970) and a review by Salkever and Bice (1978) of certificate of need programs in health care delivery concluded that a competitive market with free entry does not exist. Pauly (1978) has suggested that the competitive model might not fit the medical care delivery system in rural areas and that medical services which are consumed relatively infrequently and which must be provided on a sporadic and unscheduled basis should also deviate from the competitive model.

HYPOTHESIS

Volunteer ambulance services provide an interesting case of infrequently demanded medical services in a nonmetropolitan setting with linkages to other human and public service organizations. The use of volunteers often symbolizes community involvement and support as well as providing a source of free labor, while affiliation with other organizations may provide access to valuable financial resources (Perlstadt and Kozak, 1977b; Carpenter, 1982; Palmer and Edward, 1982). This combination may eventually lead to subsidization and protection of the volunteer service against various economic pressures and constraints. Two sets of hypotheses are therefore proposed. The first set relates organizational linkages, economic demand and organizational size to the financial solvency of volunteer ambulance services. The second set introduces competition as an intervening variable.

Affiliation with human public service agencies may link a volunteer service to a more well organized, bureaucratic structure with access to financial resources. The first hypothesis, the, is that the more bureaucratic the affiliate organization, the less likely the volunteer service is to be financially solvent. In addition, the linkages between the volunteer service and these other organizations may vary in degree from being rather formal and contractual to an informal, loosely linked relationship. The second hypothesis is that the more formal the degree of affiliation, the less likely the volunteer service is to be financially solvent. The third and fourth hypotheses follow the general theories and findings of economics and sociology of organizations. An economy of scale, in terms of financial solvency, should exist over the range of demand for service and the range of organization size.

The second set of hypotheses expands the first four by including competition as an intervening variable. The theory of pure competition assumes profit maximizing firms independent of government control or the influence of other organizations. But volunteer ambulance services are not necessarily profit maximizers and many are affiliated with public service and governmental agencies. On the other hand, if competition does exist, the volunteer ambulance service is most likely to be the marginal competitor in an oligopolistic market situation.

The fifth hypothesis, then, states that volunteer ambulance services in competitive situations are more likely to break even regardless of organizational affiliation compared with services in noncompetitive settings. The sixth hypothesis is that in competitive settings, those with affiliations which are informal are more likely to break even. The seventh and eighth hypotheses deal with competition and the economy of scale. Competition should tend to eliminate economies of scale over the range of demand and organizational size.

METHODS

A questionnaire was constructed and sent to volunteer ambulance services to explore the relationships between organizational structure, interorganizational linkages and economic constraints. The questionnaire was pretested on several volunteer ambulance services in Michigan. Addresses of volunteer ambulance services in several States were obtained from published directories and questionnaires were mailed to those services that were clearly designated as volunteer or thought to be volunteer because the word "community" appeared in their name. Questionnaires were sent to 235 volunteer ambulance services in 8 States. The services were located in small towns and most were outside major metropolitan areas. The overall response rate was 69.4 percent. Several of the responses were from ambulance companies that reported they were not voluneer services. The response rate seemed to vary directly with distance from Michigan and accuracy in identifying volunteer services from published directories. The response rate by State is presented in table 6.1.

FINDINGS

The dependent variable in the study concerned the financial solvency of the volunteer ambulance services. The questionnaire asked quite directly, "For the last fiscal year, did your service show a profit, break about even, or show a loss?" Of 119 services answering this question, 71.4 percent reported breaking about even and 28.6 percent ended up showing a loss. Not one service admitted showing a profit. The use of the term "profit" might have been an unfortunate choice for a volunteer and perhaps nonprofit charitable organization. Nevertheless a dichotomous variable of breaking even versus showing a loss was constructed and used as the dependent variable.

The first two hypotheses deal with the relationship between volunteer ambulance services and other public service organizations. The questionnaire asked: "Is your ambulance service formally or informally affiliated with any of the following organizations—fire department; city or county government; police department or sheriff's office; hospital, and other?" The data indicated that 77.2 percent of 145 volunteer ambulance services reported an affiliation with another organization and some reported multiple affiliations. The most frequent affiliation reported (60.7 percent of the 145 services) was with fire departments. Of those affiliated with fire departments, 56.8 percent described their link as being formal while the remainder reported informal links.

The next most common affiliation, reported by 51.0 percent of 145 services, was with a unit of local government, with 67.6 percent of the affiliations being described as formal. Finally 44.1 percent of the 145 services reported an affiliation with a law enforcement agency, either a police department or sheriff's office. Of these, 26.6 percent were described as being formal in nature.

Table 6.2 explores the relationships between breaking even, organizational affiliation and degree of affiliation. Looking across the rows of the table we see that services affiliated with fire departments were most likely to break even. Those informally affiliated with law enforcement agencies were less likely to break even while those formally affiliated with a unit of local government were least likely of all to break even. Looking down the columns we observe that regardless of organizational affiliation, volunteer ambulance services with informal affiliations are more likely to break even than those with formal affiliations.

The next two hypotheses stated that an economy of scale phenomenon exists for volunteer ambulance services in terms of demand and organizational size. Demand was measured by asking: "About how many emergency calls does your service average per month?" Demand had a mean of 23 calls per month and a median of 13, and was divided into four fairly equal groups ranging from 6 calls or less per month to 25 or more. Table 6.3 reveals the hypothesized economy of scale phenomenon since volunteer ambulance services with very few or very many calls were less likely to break even than services with a moderate number of calls per month. In particular 84 percent of the volunteer services reporting 7 to 12 calls per month (between 2 to 3 a week) reported breaking even.

Table 6.4 shows the same economy of scale phenomenon when looking at the size of the ambulance service as measured by its number of volunteers. Size had a mean of 24 volunteers and a median of 21, and was divided into 4 fairly equal groups ranging from 12 or fewer to 30 or more volunteers. The percentage of volunteer ambulance services breaking even rises from 60.9 percent for the very smallest to a peak of 83.3 percent for services between 22 to 29 volunteers, and then drops off to 66.7 percent for the very largest volunteer organizations.

The second set of hypotheses introduced competition as an intervening or control variable. The questionnaire asked: "Are there other ambulance services in your service area?" The existence of other ambulance companies within the self-defined service area was reported by 39.1 percent of 151 volunteer services. This means that 60.9 percent of the volunteer services in the study had no competition and provided the only ambulance service available in their area. The existence of competition by itself had no effect on whether or not a volunteer ambulance service broke even. Of 49 services reporting a competitor, 71.4 percent broke even while 72.9 percent of the 70 services reporting no competitor broke even.

Nevertheless, when competition is used as a control or intervening variable, some interesting situations are pinpointed. Table 6.5 shows the relationship between type of organization and breaking even—when controlling for the existence of competition. Looking down the columns we can see that the presence of competition has no effect on the relationship between organization of affiliation and breaking even. But in the second column we observe that in the absence of competition, volunteer ambulance services affiliated with units of local government or law enforcement agencies are less likely to break even than those affiliated with fire departments.

Table 6.6 indicates that competition has no effect on the relationship between degree of affiliation and breaking even. Regardless of competition, volunteer services with informal linkages are more likely to break even than those with formal linkages. Table 6.7 explores degree of affiliation and breaking even—when controlling for competition among those services affiliated with fire departments and units of local government. It reveals that volunteer ambulance services having formal affiliations with fire departments are, in the presence of competition, least likely to break even, while services having formal affiliations with units of local government, in the absence of competition, are least likely to break even.

Tables 6.8 and 6.9 demonstrate that competition does not effect the basic curvilinear pattern for economy of scale found earlier over the range of demand or organizational size. It does appear, however, that the existence of competition increases the likelihood that a volunteer ambulance service experiencing low demand will break even. This can be seen by first looking across the top two rows in table 6.8, and then comparing the 71.4 percent and 100.0 percent in table 6.8 with 62.1 percent and 84.0 percent for the same categories of demand in table 6.3. In table 6.9 we find that for both cases where volunteer services were small in size and faced competition, they broke even. The small number of cases in this cell, however, reflects the natural variance of cases given the division of organizational size into four fairly equal categories for purposes of the analysis. Perhaps only a very few small volunteer services will emerge in the face of competition and those that do must break even to survive. All of the other very small services exist in the absence of competition.

DISCUSSION

Volunteer ambulance services in nonmetropolican areas are most likely to be affilated with fire departments. In general fire departments and ambulance services are oriented toward saving lives and extracting people from perilous situations. Many rural and small town fire departments are staffed by volunteers, and therefore, affiliation with a volunteer ambulance service would appear to be quite compatible. It is also possible that the two would have overlapping members. Both are staffed by volunteers because the population is too small to generate enough episodes to warrant a full time paid service.

In contrast, both units of local government and law enforcement agencies such as police departments and sheriff's offices have full time paid personnel and are much more bureaucratic in nature. Units of local government must publicly account for their activities and expenditures. If a town or county board provides parking space for the ambulances and office space for ambulance service headquarters, a formal agreement may be required. On the other hand, a direct allocation of funds to various community organizations including the volunteer ambulance service may signify an informal connection.

Police and sheriff's officers are often the first to arrive at the scene of an accident or trauma, and approximately half of all calls reported by volunteer ambulance services in the study originated from a law enforcement officer or agency. This type of communication and cooperation between the two organizations helps explain the predominance of informal affiliations. Formal affiliations may be more problematic since maintaining the peace and apprehending law breakers will take priority over many medical emergencies.

All this suggests that fire departments appear to be less bureaucratic while law enforcement and local governments appear to be more bureaucratic. Given the voluntary nature and small size of the ambulance services in this study, the predominance of affiliations with fire departments is understandable. But affiliation with a more bureaucratic organization may mean access to resources and possible subsidies of the volunteer ambulance service.

Hypothesis 1 stated that the more bureaucratic the affiliate organization, the less likely the volunteer service is to be financially solvent, and the data supported this conjecture. Those affiliated with the less bureaucratic fire departments were most likely to break even. Hypothesis 2 stated that the more formal the degree of affiliation the less likely the volunteer service is to be financially solvent, and this was upheld for all three types of affiliate organizations. Apparently formal linkages must be associated with some form of subsidy, even for services having a formal affiliation with a fire department.

The two hypotheses dealing with the existence of eonomy of scale phenomenon were also upheld. Services facing very low demand (less than two calls per week) were least likely to break even as were volunteer ambulance services facing very high demand (about one call per day). The former apparently lack the volume necessary to generate sufficient revenue and keep members in practice while the latter may be overburdened and overextended as a volunteer service. Similar findings and explanations exist for economy of scale and organizational size. Here the larger services with over 30 members may have social and community aspects that go beyond the delivery of emergency medical services. It is possible that the larger membership can directly subsidize the service or that the maintenance of these social and community activities places a financial burden on the service itself.

The second set of hypotheses, which introduced competition, did not have a dramatic effect on financial solvency. The absence of competition combined with affiliation with a more bureaucratic organization—local government or law enforcement—reinforced the trend that such ambulance services were less likely to break even and more likely to be subsidized. Competition did not effect the previously found relationship between degree of affiliation, that is formal or informal links, and financial solvency. These findings tend to support the contention of Pauly (1978) that the competitive model might not fit medical services in rural areas.

On the other hand, competition did not upset the economy of scale phenomenon which was found over the range of demand and organizational size. This study found that a heavy demand on volunteer services, as well as a large number of volunteers, will lead to financial problems. But those few services that were small in size or faced a very low demand reacted to competition by being more likely to attain financial solvency than similar services that did not face competition.

CONCLUSION

It now appears that volunteer ambulance services in nonmetropolitan areas behave pretty much as expected once the market environment is ascertained. Formal affiliation with units of local government or law enforcement agencies lead to not breaking even and possible subsidies, just as they do in the general economy. Medium sized services facing moderate demand tend to attain financial solvency more often than organizations at the extremes of demand and size.

In terms of policy implications, an informal affiliation with a fire department seems most likely to produce a financially viable volunteer service in a small town or rural area. Viability is enhanced if the service faces a moderate demand (which can be partially determined by the boundaries of the service area) and if the number of volunteers ranges between about 15 to 30. In sum, planners and providers of emergency medical services to rural people should consider the effects or organizational linkages and size along with medical need when designing and implementing their programs.

REFERENCES

Aiken, M., Hage, J. Organizational interdependence and intra-organizational structure. *American Sociological Review,* 1968, 33, 912–930.

Beale, C. L. The Revival of Population Growth in Nonmetropolitan America. Washington, D.C.: United States Department of Agriculture, ERS–604, 1975.

Blau, P. M., Schoenherr, R. A. *The Structure of Organizations.* New York: Basic Books, 1971.

Carlson, J. E., Lassey, M. L., and Lassey, W. R. *Rural Society and Environment in America.* New York: McGraw-Hill, 1980, 115.

Carpenter, C. Human resource planning and management. In B. Bisbee, Jr. (Ed.), *Management of Rural Primary Care—Concepts and Cases*. Chicago: Hospital Research and Educational Trust, 1982.

DeJong, G., Sell, R. Population redistribution, migration and residential preferences. *Annals of American Academy of Political and Social Science*, 1977, 429, 130-142.

Evan, W. (Ed.) *Inter-Organizational Relations*. Philadelphia: University of Pennsylvania Press, 1978.

Gibson, G. Emergency medical services: Regionalizing intents and localizing effects. In Ginsburg, E. (Ed.), *Regionalizaiton and Health Care*. Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1978, 85-98.

Lawrence, P. and Lorsch, J. *Organizational and Environment*. Cambridge, Mass.: Harvard University Press, 1967.

Levine, S. and White, P. Exchange as a conceptual framework for the study of interorganizational relationships. *Administration Science Quarterly*, 1961, 5, 583-610.

Murrin, K. Laying the groundwork: Issues facing rural primary care. In Bisbee, G. Jr. (Ed.), *Management of Rural Primary Care—Concepts and Cases*. Chicago: Hospital Research and Educational Trust, 1982.

Palmer, R., and Edward, A. Financing the development of rural primary care centers. In Bisbee, G., Jr. (Ed.), *Management of Rural Primary Care—Concepts and Cases*. Chicago: Hospital Research and Educational Trust, 1982.

Pauly, M. Is medical care different? In Greenberg, W. (Ed.), *Competition in the Health Care Sector: Past, Present and Future*. Rockville, Maryland: Aspen Publishers, 1978, 11-35.

Perlstadt, H. and Kozak. L. Emergency medical services in small communities: Volunteer ambulance corps. *Journal of Community Health*, 1977, 2, 178-188. (a)

Perlstadt, H. and Kozak, L. Health care and delivery systems: Emergency medicine as a prototype. *Society*, 1977, 14, 41-46. (b)

Perry, B. Transportation and communication as components of rural health care delivery. In Hassinger, E. and Whiting, L. (Eds.), *Rural Health Services: Organization, Delivery and Use*. Ames, Iowa: Iowa State University press, 1976, 81-94.

Ploch, L. The reversal in migration patterns: Some rural development consequences. *Rural Sociology*, 1978, 43, 293-303.

Roemer, M. *Rural Health Care*. St. Louis: Mosby, 1976.

Salkever, D. and Bice, T. Certificate-of-need legislation and hospital costs. In Zubkoff, M., Raskin, I. and Hanft, R. (Eds.), *Hospital Cost Containment: Selected Notes for Future Policy*. New York: PRODIST-MILBANK Mem F, 1978.

Scherer, F. *Industrial Market Structure and Economic Performance*, Chicago: Rand McNally, 1970.

Stevenson, K. Operational Aspects of Emergency Ambulance Services: Technical Report 61. Cambridge, Mass.: Operations Research Center, MIT, 1971.

Waller, J. Urban Oriented methods: Failure to solve rural emergency care problems. *Journal of American Medical Association*, 1973, 266, 1441-1446.

Wardwell, J. Equilibrium and change in nonmetropolitan growth. *Rural Sociology*, 1977, 42, 156-179.

Table 6.1: Questionnaire Response Rate

State	Response Rate	N Questionnaires Mailed
Michigan	86.7%	61
Illinois	76.7%	43
Maine	75.0%	24
Nebraska	64.5%	31
Utah	62.5%	40
South Carolina	44.0%	25
Colorado	--	11
Arkansas	--	3

Table 6.2: Breaking Even by Type of Organization and Degree of Affiliation

Degree of Affiliation	(%Breaking Even)		
	Fire	Government	Law Enforcement
Informal	87.1% (31)	80.0% (20)	71.8% (39)
Formal	67.6% (37)	58.5% (41)	64.3% (14)

N = 182 (multiple affiliations)

Table 6.3: Breaking Even by Demand

Demand (N Calls/Month)	% Breaking Even
1-6	62.1% (29)
7-12	84.0% (25)
13-24	79.3% (29)
25+	64.0% (25)

N = 109

Table 6.4: Breaking Even by Size of Organization

Size of Organization (N Volunteers	% Breaking Even
1-13	60.9% (23)
14-21	78.6% (28)
22-29	83.3% (29)
30+	66.7% (21)

N = 101

Table 6.5: Breaking Even by Type of Organization and Competition

	(% Breaking Even) Competition	
Type of Organization	Present	Absent
Fire Department	72.4% (29)	79.5% (39)
Local Government	73.9% (26)	62.2% (28)
Law Enforcement	73.1% (15)	66.7% (37)

N=174 (multiple affiliations)

Table 6.6: Breaking Even by Degree of Affiliation and Competition

	(% Breaking Even) Competition	
Degree of Affiliation	Present	Absent
Informal	80.5% (41)	79.2% (48)
Formal	64.9% (37)	61.8% (55)

N = 181 (multiple affiliations)

Table 6.7: Breaking Even by Degree of Affiliation and Competit
Among Services Affiliated with Fire Departments or
Local Government

(% Breaking Even)

	Fire Departments		Local Government	
	Competition		Competition	
Degree of Affiliation	Present	Absent	Present	Absent
Informal	92.3% (13)	83.3% (18)	87.5% (8)	81.8% (11)
Formal	56.2% (16)	76.2% (21)	66.7% (15)	53.8% (26)
	N = 68		N = 60	

Table 6.8: Breaking Even by Demand and Competition

(% Breaking Even)

	Competition	
Demand (N Calls/month)	Present	Absent
1-6	71.4% (7)	61.9% (21)
7-12	100.0% (7)	77.8% (18)
13-24	80.0% (15)	78.6% (14)
25+	60.0% (15)	72.7% (11)

N = 108

Table 6.9: Breaking Even by Organizational Size and Competition

(% Breaking Even)

	Competition	
Organizational Size (N Volunteers)	Present	Absent
1-13	100.0% (2)	57.1% (21)
14-21	69.2% (13)	86.7% (15)
22-29	83.3% (6)	83.3% (18)
30+	66.7% (12)	75.0% (8)

N = 95

DETERRING THE ONSET OF SMOKING IN RURAL VERMONT SCHOOLS: RESULTS FROM A 2-YEAR STUDY

An enduring criticism of adolescent smoking deterrence programs has been that such programs do not produce findings that are usable by other researchers or by communities seeking programs for local use. The problem is due in part to methodological deficiencies, including poorly defined treatments, inadequate conceptual bases for the treatments, lack of controls, and lack of objective measures of smoking rates. However, since the early 1970's, program developers have responded systematically to the deficiencies of the earlier period. An emerging profile of an ideal research design in the adolescent area has shaped these programs.

A major step toward improved research was the release in 1973 of *"Guidelines for Research on the Effectiveness of Smoking Cessation Programs"* (Bergland, 1973) published by the National Interagency Council on Smoking and Health. The emphasis of this report was on standardizing evaluation activities and techniques. Funded largely from Federal sources, several ambitious programs incorporating detailed evaluation plans were begun in the next several years. By the issuance of the 1979 Surgeon General's report, there existed a much clearer view of how research into adolescent smoking should be conducted. These requirements indicated that the best research was complex, comprehensive, and usually costly. It is not surprising, therefore, that only a few research teams have been funded adequately enough to conduct programs that meet these guidelines.

An important benefit of these methodological developments is that efforts to replicate studies are now more feasible. With more carefully drawn research designs, a program tested in one site can be tested in another site away from the original research teams. Influenced by this progress, we have studied the potential effectiveness of the smoking deterrence strategies developed by Richard Evans in Houston and Alfred McAlister in the Boston area. We asked whether the promising programs of Evans and McAlister, both tested in urban locales, would deter smoking among adolescents in rural Vermont. In addition, we identified several questions pertaining to the practical value of this prior research. How feasible and costly are the programs? What are the comparative assets and liabilities of different programs? How are various subgroups of students (for example, male versus female) affected by the programs?

Under a grant from the National Institutes of Health, researchers at the Vermont Lung Center have implemented (1980–82) three programs (in two schools each) designed to deter the onset of smoking among seventh grade boys and girls. Four additional schools served as controls. The three interventions (teacher led, expert led, and peer led) draw upon social-psychological strategies and attempt to counter pressures to smoke from peers, adults, and the media. The peer-lead program is similar to the work of McAlister and the expert-led program is similar to the work of Evans. Thus, this research was designed, in part, to replicate the approaches of McAlister and Evans and to determine if there would be different results and patterns of feasibility in a more rural setting.

Assessments of smoking behavior (including self-reports and saliva thiocyanate) were completed in October 1980, April 1981, and October 1981. In addition, students completed a survey of perceived internal-external locus of control (a version of the Nowicki and Strickland scale was used). This paper reports the results of the three interventions as indicated by the baseline survey of October 1980 and the subsequent surveys of April 1981 and October 1981.

Earlier data from this study were reported in June 1981 at the Fifth Annual Institute of the American Rural Health Association. That paper addressed the relationship between the degree of rurality of a school and the smoking patterns of its students. Utilizing selected indexes of rurality, each school received a ranking on a rurality scale. Rurality scores were correlated with rates of smoking, as measured by saliva thiocyanate, and scores on the locus of control scale. We reported that (1) increased rurality was related to higher levels of cigarette smoking; (2) increased rurality was related to higher perceived external locus of control; and (3) high smoking levels were related to high perceived external locus of control.

PROFILE OF THE INTERVENTIONS

An extensive review of the literature and visits to see the work of Evans and McAlister produced a framework for describing alternative interventions to deter the onset of smoking. Three points along a continuum were identified: A version of the Evans program, a version of the McAllister program, and a program utilizing the classroom teacher as the focal point. Table 7.1 includes characterizations of the three programs that were implemented.

The inclusion of a teacher-led intervention reflects the view that for many school districts the teacher is likely to be the most available and least costly resource. Although some researchers have questioned the credibility, commitment and skills of the classroom teacher in implementing a complex deterrence program, others have begun to challenge this assumption. For example, the July 1980 issue of the American Journal of Public Health editorialized as follows:

> While much research and theorizing about the impact of models or exemplars indicates that attractive peers may be more effective than authority figures, this has not been demonstrated within these programs. One imagines that the programs might be implemented more easily with teachers than peers * * *. It may be that appropriate high school staff or adult volunteers, trained to be nonjudgmental and sympathetic, may be as effective as peers in implementing these programs (Fisher, 1980).

The Vermont interventions were presented for 4 consecutive days during October 1980 in seventh grade classrooms. A brief, 30-minute session was presented to the same students the following April. Except for evaluation activities in October and April of the following school year, there were no further contacts with the students.

Each intervention relied on a common package of learning materials, including exercises and didactic information to serve as stimuli for the program. The program tapes were produced with public school students in a small community in Vermont similar in demographic characteristics to the experimental communities. Each tape depicted short dramatic scenes of peer influence and pressure that were improvised by the students themselves under the guidance of the project staff. Following each scene, students in the classroom discussed their impressions of the actions portrayed and suggested ways to resist peer, media, or adult pressures to smoke. The dilemmas and vulnerabilities of adolescence were presented in a realistic manner. Each tape has a duration of 8 to 10 minutes and is the basis of followup classroom activities.

SMOKING TRENDS FOR TREATMENT AND CONTROL SCHOOLS

This paper presents self-report data for each school and treatment. Sample size for the three measurement points remained constant by school and sex of respondent, with only minor fluctuations at each point.

At each test point, students were asked:

—Have you smoked a cigarette in the last month?

—Have you smoked a cigarette in the last week?

—Did you smoked a cigarette yesterday?

The responses were tabulated to show the percentage of students in each school who answered "yes." In addition, students were asked how often they smoke cigarettes, with various response options from "never" to two or more a day. The percentage of students in each school who indicated they smoked one or more cigarettes a day have been tabulated. Only smoking trends for one question (smoked last week) are reported here. Some potentially significant trends appearing on all four questions are somewhat more accentuated for the last week inquiry.

Table 7.2 presents the results for each treatment (two schools each) and the four control schools at each of the three measurement points. The data for males and females suggest that the teacher and peer interventions may have deterred successfully the onset of smoking over a 12-month period. However, smoking rates in the expert intervention and in the control schools seems to have risen significantly. An examination of the results by sex indicates that female smoking has contributed most prominently to the overall acceleration of smoking in the export and controls schools.

Figure 7.3 presents a graphical representation of femal smoking rates across time for each of the interventions, including the control condition. As pointed out above, it appears that the peer and teacher interventions have been more successful at arresting the rate of increase of smoking among females. We much recognize, however, that the baseline smoking rate for the peer intervention was at a higher level than the other interventions or controls. In particular, it may be that the baseline for the peer schools was so high that it was unlikely that there would be much upward movement regardless of the treatment effectiveness, while the teacher-led intervention may indeed offer some significant possibilities for working with females. Conversely, the expert-led intervention is notably unsuccessful in inhibiting smoking among females.

Table 7.4 presents the same data broken out for each school within treatment modalities. It is clear that the overall mean for each intervention (table 7.2) masks individual school differences. Looking at the two peer schools, for example, school five shows a favorable trend in smoking behavior (that is, fewer students smoking a year later) and school six shows a marked acceleration of smoking. Despite these important differences among schools, it does appear that the trend for females in expert-led and control schools is consistent across all six schools. To a noticeable degree, females report higher rates of smoking at the end of the year.

DEGREE OF RURALITY AS AN INFLUENCE ON SMOKING BEHAVIOR OVER TIME

All 10 of the schools examined in this study are at the rural end of the American social spectrum. The schools are located in towns and small cities ranging in population from 15,700 to 2,400. Nevertheless, the 10 schools can be distinguished from each other on a continuum of rurality. A rurality scale, defined by total population of community, population density, income and percentage employed in agriculture, was developed to distinguish the 10 schools on the continuum (see table 7.5).

The more rural community has the more negative score; that is, school 10 is located in the most rural community. Baseline assessments of smoking behavior demonstrated that a higher degree of rurality, as measured by the constructed rurality scale, is associated with higher levels of smoking.

To examine the issue of rurality in the absence of a treatment effect, we turn our attention to the four control schools. All four control schools (schools Nos. 7, 8, 9, and 10) are at the rural end of the scale that we constructed. Figure 7.6 shows smoking trends for females among the four control schools and the degree of rurality of each school.

The least rural of the schools—school No. seven—has the most favorable trend line that is, low rate of smoking uptake). The other three schools show a definite upward trend line. Unfortunately, the number of schools is too limited to attempt any generalizations about degree of rurality and smoking trends. Furthermore, the clustering of the control schools at the rural end of the scale makes sharp distinctions even more difficult. Thus, confident insights into the rurality factor must await a comprehensive study designed specifically to test for the influence of rurality over time.

IMPLICATIONS

Three trends reported have provided clues to smoking patterns and the effectiveness of deterrence strategies in rural localities. The consistency of the smoking patterns for females must be noted. Especially for schools receiving the expert-led interventions and the control schools, females seem to take up smoking at a much higher rate than males. A tentative conclusion is that the utilization of outside experts is not an effective mode for deterring smoking, especially for females. One might conclude also that the teacher-led and peer-led interventions represent promising deterrence strategies.

It is important to recognize that these findings pertain to schools located in rural America. One may anticipate that the findings will have practical utility for educators in other rural settings. If this is indeed the case, a central rationale for the present study—the replication of deterrence strategies away from the original urban-based trials—will have been sustained.

REFERENCES

Berglund, E. L., et al. *Guidelines for Research on the Effectiveness of Smoking Cessaton Programs.* Washington, D.C.: National Interagency Council on Smoking and Health, Committee Report, September 1971.

Fisher, E., "Progress in Reducing Adolescent Smoking," *American Journal of Public Health.* 1980, 70, 7, 679.

Table 7.1: Continuum of Smoking Interventions

Assumption: the onset of smoking behavior among 7th graders results from peer pressure, adult modeling pressure, and media pressure.

Strategy: smoking prevention programs should give 7th graders a perception of peer, family and media pressure with strategies for resisting those influences.

Primary Reliance on One-Way Flow of Information	Primary Reliance on Group-Oriented Flow of Information
expert influence	peer influence
information	verbal interaction
adult authority	peer models
no feedback cycling	extensive feedback cycling
didactic methods	evocative methods

Treatments:

EXPERT-BASED	TEACHER-BASED	PEER-BASED
A. Outside expert presents info: (slides, graphs, statistics, etc.) (Script)	A. Teacher presents information and basic problem (Script)	A. Peer group presents problem (Script)
B. Expert shows a film (with peer Star)	B. Students view examples (pictures tape, slides, etc.	B. Students and peer leader analyze problem (slides, pictures, tape, etc.)
C. Expert interprets film, providing more examples.	C. Small groups meet to solve problems.	C. Students rehearse solution strategies.
D. Expert describes prevention strategies.	D. Groups report solutions; teacher provides reinforcement.	D. individuals reveal strategies and receive peer reinforcement.

Table 7.2: Characteristic - % Smoked Last Week (Standard Error in Parenthesis)

	Teacher	Expert	Peer	Control
		Both Sexes		
Fall 1980	11(.023)	9(.017)	15(.018)	8(.013)
Spring 1981	8(.020)	8(.017)	12(.017)	10(.014)
Fall 1981	15(.026)	17(.023)	17(.019)	17(.017)
		Males		
Fall 1980	13(.034)	13(.028)	11(.022)	10(.019)
Spring 1981	11(.030)	8(.025)	9(.021)	9(.020)
Fall 1981	20(.039)	14(.031)	14(.025)	13(.022)
		Females		
Fall 1980	9(.031)	4(.018)	19(.030)	8(.016)
Spring 1981	5(.024)	8(.024)	15(.027)	11(.020)
Fall 1981	10(.031)	20(.032)	21(.030)	21(.024)

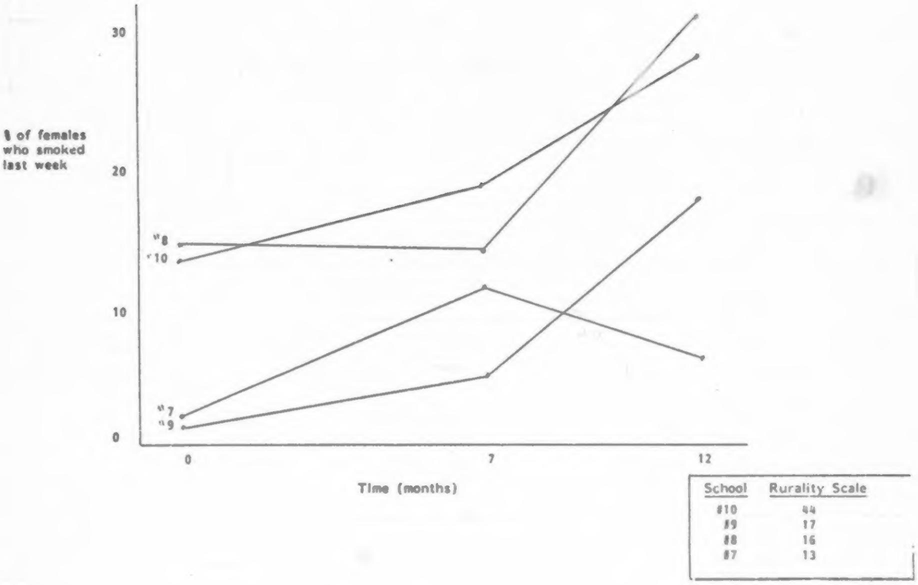
Table 7.3: Characteristic - % Smoked Last Week (Standard Error in Parentheses)

	Teacher		Expert		Peer		Control			
School	1	2	3	4	5	6	7	8	9	10
					Both Sexes					
Fall 1980	13(.028)	5(.035)	13(.033)	6(.018)	19(.024)	6(.022)	3(.015)	17(.031)	2(.012)	11(.036)
Spring 1981	9(.024)	6(.033)	9(.029)	7(.021)	10(.020)	15(.036)	10(.024)	15(.036)	6(.021)	11(.038)
Fall 1981	17(.031)	10(.042)	25(.041)	13(.026)	11(.019)	33(.045)	7(.021)	28(.038)	14(.027)	23(.057)
					Males					
Fall 1980	16(.043	4(.044)	26(.069)	6(.026)	14(.028)	5(.031)	5(.025)	19(.047)	2(.022)	9(.050)
Spring 1981	11(.036)	10(.054)	15(.062)	5(.024)	9(.026)	7(.035)	8(.031)	17(.059)	8(.037)	6(.038)
Fall 1981	21(.047)	16(.066)	21(.066)	12(.035)	9(.024)	28(.059)	8(.030)	21(.052)	11(.038)	14(.079)
					Females					
Fall 1980	10(.035)	6(.063)	5(.026)	4(.025)	25(.039)	6(.033)	1(.015)	15(.040)	2(.015)	13(.054)
Spring 1981	7(.031)	0(.000)	5(.029)	10(.038)	11(.029)	23(.061)	12(.040)	14(.046)	5(.025)	18(.067)
Fall 1981	13(.040)	0(.000)	27(.053)	14(.038)	13(.030)	40(.067)	6(.030)	33(.052)	17(.039)	29(.078)

Table 7.4: Degree of Rurality as an Influence on Smoking Behavior Over Time

SCHOOL	POPULATION	(PERSONS/SQ. MI.) DENSITY	INCOME	% IN AGRIC.	RURALITY SCALE
#10	1981	57	8070	13	-44
#9	3040	210	9444	14	-17
#8	3760	87	11016	14	-16
#6	2915	80	9847	7	-13
#7	4642	137	10919	16	-13
#3	1935	56	11513	7	-5
#2	2961	76	10032	4	-5
#4	8748	293	9904	5	30
#1	6727	156	13021	6	32
#5	12333	340	10168	3	51

Figure 7.5



School	Rurality Scale
#10	44
#9	17
#8	16
#7	13

Figure 7.6: Comparison of Smoking Prevalence Rate Among Experimental Groups